

METHODS FOR IDENTIFYING RISK OF OSTEOARTHRITIS AND TREATMENTS THEREOF

Field of the Invention

[0001] The invention relates to genetic methods for identifying risk of osteoarthritis and treatments that specifically target such diseases.

Background

[0002] Osteoarthritis (OA) is a chronic disease usually affecting weight-bearing synovial joints. There are approximately 20 million Americans affected by OA and it is the leading cause of disability in the United States. In addition to extensive human suffering, OA also accounts for nearly all knee replacements and more than half of all hip replacements in the United States. Despite its prevalence, OA is poorly understood and there are few treatments available besides anti-inflammatory drugs and joint replacement.

[0003] Osteoarthritis (OA) is a disease caused by degeneration of articular cartilage and subsequent joint deformation. In addition to risk factors like body weight, joint injury and age, there is a strong hereditary component to OA, reflected by high heritability estimates from twin studies. So far, few of the genes responsible for this genetic component have been identified.

Summary

[0004] It has been discovered that certain polymorphic variations in human genomic DNA are associated with osteoarthritis. In particular, polymorphic variants in loci containing *KIAA0296*, *Chrom 4*, *PSMB1*, *TBP*, *PDCD2*, *ELP3*, *LRCH1*, *SNW1* and *ERG* regions and other regions in Table A of human genomic DNA have been associated with risk of osteoarthritis. Some of the associated polymorphic variants fall in an intergenic region on chromosome 4 that does not include a known gene; therefore, the region is referred to herein as the *Chrom 4* region. Also, the *PSMB1*, *TBP* and *PDCD2* regions are located in a larger region referred to herein as the *Chrom 6* region.

[0005] Thus, featured herein are methods for identifying a subject at risk of osteoarthritis and/or a risk of osteoarthritis in a subject, which comprise detecting the presence or absence of one or more polymorphic variations associated with osteoarthritis in or around the loci described herein in a human nucleic acid sample. In an embodiment, two or more polymorphic variations are detected in two or more regions of which one is the *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* region or other region in Table A. In certain embodiments, 3 or more, or 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20 or more polymorphic variants are detected.

[0006] Also featured are nucleic acids that include one or more polymorphic variations associated with occurrence of osteoarthritis, as well as polypeptides encoded by these nucleic acids. In addition, provided are methods for identifying candidate therapeutic molecules for treating osteoarthritis, as well

as methods for treating osteoarthritis in a subject by identifying a subject at risk of osteoarthritis and treating the subject with a suitable prophylactic, treatment or therapeutic molecule.

[0007] Also provided are compositions comprising a cell from a subject having osteoarthritis or at risk of osteoarthritis and/or a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A, with a RNAi, siRNA, antisense DNA or RNA, or ribozyme nucleic acid designed from a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A. In an embodiment, the RNAi, siRNA, antisense DNA or RNA, or ribozyme nucleic acid is designed from a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A that includes one or more polymorphic variations associated with osteoarthritis, and in some instances, specifically interacts with such a nucleotide sequence. Further, provided are arrays of nucleic acids bound to a solid surface, in which one or more nucleic acid molecules of the array have a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A, or a fragment or substantially identical nucleic acid thereof, or a complementary nucleic acid of the foregoing. Featured also are compositions comprising a cell from a subject having osteoarthritis or at risk of osteoarthritis and/or a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* polypeptide or other polypeptide referenced in Table A, with an antibody that specifically binds to the polypeptide. In an embodiment, the antibody specifically binds to an epitope in the polypeptide that includes a non-synonymous amino acid modification associated with osteoarthritis (*e.g.*, results in an amino acid substitution in the encoded polypeptide associated with osteoarthritis). In certain embodiments, the antibody selectively binds to an epitope in the *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* polypeptide, or other polypeptide referenced in Table A, having an amino acid associated with osteoarthritis. Thus, featured is an antibody that binds an epitope having an amino acid encoded by rs734784, rs1042164, rs749670, rs955592, rs241448 and/or rs1040461, such as a valine or isoleucine encoded by rs734784 (*e.g.*, a valine at position 489 in a *KCNS1* polypeptide), a valine or alanine encoded by rs1042164 (*e.g.*, a valine at position 133 in a *IER2* polypeptide), a glutamate or glycine encoded by rs749670 (*e.g.*, a glutamate at position 327 in a *KIAA0296* polypeptide), a threonine or isoleucine encoded by rs955592 (*e.g.*, a threonine at position 70 in a *RBED1* polypeptide), a glutamine or termination encoded by rs241448 (*e.g.*, a glutamine at position 687 in a *TAP2* polypeptide) or a glycine or serine encoded by rs1040461 (*e.g.*, a glycine at position 207 in a *RAB23* polypeptide) at the corresponding position in the polypeptide.

Brief Description of the Drawings

[0008] Figures 1A-1G show proximal SNPs in a 100-kb window in *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* and *ERG* regions of genomic DNA, respectively, that were compared between pools of cases and controls. The x-axis corresponds to their chromosomal position and the y-axis to the test P-values (shown on the $-\log_{10}$ scale). The continuous dark line presents the results of a goodness-of-

fit test for an excess of significance (compared to 0.05) in a 10 kb sliding window assessed at 1 kb increments.

Detailed Description

[0009] It has been discovered that polymorphic variants in a locus containing a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* region are associated with occurrence of osteoarthritis in subjects. Thus, detecting genetic determinants associated with an increased risk of osteoarthritis occurrence can lead to early identification of a predisposition to osteoarthritis and early prescription of preventative measures. Also, associating a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* polymorphic variant and other variants referenced in Table A with osteoarthritis has provided new targets for screening molecules useful in treatments of osteoarthritis.

Osteoarthritis and Sample Selection

[0010] Osteoarthritis (OA), or degenerative joint disease, is one of the oldest and most common types of arthritis. It is characterized by the breakdown of the joint's cartilage. Cartilage is the part of the joint that cushions the ends of bones, and its breakdown causes bones to rub against each other, causing pain and loss of movement. Type II collagen is the main component of cartilage, comprising 15-25% of the wet weight, approximately half the dry weight, and representing 90-95% of the total collagen content in the tissue. It forms fibrils that endow cartilage with tensile strength (Mayne, R. Arthritis Rheum. 32:241-246 (1989)).

[0011] Most commonly affecting middle-aged and older people, OA can range from very mild to very severe. It affects hands and weight-bearing joints such as knees, hips, feet and the back. Knee OA can be as disabling as any cardiovascular disease except stroke.

[0012] Osteoarthritis affects an estimated 20.7 million Americans, mostly after age 45, with women more commonly affected than men. Physicians make a diagnosis of OA based on a physical exam and history of symptoms. X-rays are used to confirm diagnosis. Most people over 60 reflect the disease on X-ray, and about one-third have actual symptoms.

[0013] There are many factors that can cause OA. Obesity may lead to osteoarthritis of the knees. In addition, people with joint injuries due to sports, work-related activity or accidents may be at increased risk of developing OA.

[0014] Genetics has a role in the development of OA too. Some people may be born with defective cartilage or with slight defects in the way that joints fit together. As a person ages, these defects may cause early cartilage breakdown in the joint or the inability to repair damaged or deteriorated cartilage in the joint.

[0015] Inclusion or exclusion of samples for an osteoarthritis pool may be based upon the following criteria: ethnicity (e.g., samples derived from an individual characterized as Caucasian); parental ethnicity (e.g., samples derived from an individual of British paternal and maternal descent); relevant phenotype information for the individual (e.g., case samples derived from individuals

diagnosed with specific knee, hand or hip osteoarthritis (OA); case samples recruited from an OA knee replacement clinic). Control samples may be selected based on relevant phenotype information for the individual (*e.g.*, derived from individuals free of OA at several sites (knee, hand, hip etc)); and no family history of OA and/or rheumatoid arthritis. Additional phenotype information collected for both cases and controls may include age of the individual, gender, family history of OA, diagnosis with osteoarthritis (joint location of OA (*e.g.*, knee, hips, hands and spine), date of primary diagnosis, age of individual as of primary diagnosis), knee history (current symptoms, any major knee injury, menisectomy, knee replacement surgery, age of surgery), HRT history, osteoporosis diagnosis.

[0016] Based in part upon selection criteria set forth above, individuals having osteoarthritis can be selected for genetic studies. Also, individuals having no history of osteoarthritis often are selected for genetic studies, as described hereafter.

Polymorphic Variants Associated with Osteoarthritis

[0017] A genetic analysis provided herein linked osteoarthritis with polymorphic variant nucleic acid sequences in the human genome. As used herein, the term “polymorphic site” refers to a region in a nucleic acid at which two or more alternative nucleotide sequences are observed in a significant number of nucleic acid samples from a population of individuals. A polymorphic site may be a nucleotide sequence of two or more nucleotides, an inserted nucleotide or nucleotide sequence, a deleted nucleotide or nucleotide sequence, or a microsatellite, for example. A polymorphic site that is two or more nucleotides in length may be 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 or more, 20 or more, 30 or more, 50 or more, 75 or more, 100 or more, 500 or more, or about 1000 nucleotides in length, where all or some of the nucleotide sequences differ within the region. A polymorphic site is often one nucleotide in length, which is referred to herein as a “single nucleotide polymorphism” or a “SNP.”

[0018] Where there are two, three, or four alternative nucleotide sequences at a polymorphic site, each nucleotide sequence is referred to as a “polymorphic variant” or “nucleic acid variant.” Where two polymorphic variants exist, for example, the polymorphic variant represented in a minority of samples from a population is sometimes referred to as a “minor allele” and the polymorphic variant that is more prevalently represented is sometimes referred to as a “major allele.” Many organisms possess a copy of each chromosome (*e.g.*, humans), and those individuals who possess two major alleles or two minor alleles are often referred to as being “homozygous” with respect to the polymorphism, and those individuals who possess one major allele and one minor allele are normally referred to as being “heterozygous” with respect to the polymorphism. Individuals who are homozygous with respect to one allele are sometimes predisposed to a different phenotype as compared to individuals who are heterozygous or homozygous with respect to another allele.

[0019] In genetic analysis that associate polymorphic variants with osteoarthritis, samples from individuals having osteoarthritis and individuals not having osteoarthritis often are allelotyped and/or genotyped. The term “allelotype” as used herein refers to a process for determining the allele frequency for a polymorphic variant in pooled DNA samples from cases and controls. By pooling DNA from each

group, an allele frequency for each SNP in each group is calculated. These allele frequencies are then compared to one another. The term “genotyped” as used herein refers to a process for determining a genotype of one or more individuals, where a “genotype” is a representation of one or more polymorphic variants in a population.

[0020] A genotype or polymorphic variant may be expressed in terms of a “haplotype,” which as used herein refers to two or more polymorphic variants occurring within genomic DNA in a group of individuals within a population. For example, two SNPs may exist within a gene where each SNP position includes a cytosine variation and an adenine variation. Certain individuals in a population may carry one allele (heterozygous) or two alleles (homozygous) having the gene with a cytosine at each SNP position. As the two cytosines corresponding to each SNP in the gene travel together on one or both alleles in these individuals, the individuals can be characterized as having a cytosine/cytosine haplotype with respect to the two SNPs in the gene.

[0021] As used herein, the term “phenotype” refers to a trait which can be compared between individuals, such as presence or absence of a condition, a visually observable difference in appearance between individuals, metabolic variations, physiological variations, variations in the function of biological molecules, and the like. An example of a phenotype is occurrence of osteoarthritis.

[0022] Researchers sometimes report a polymorphic variant in a database without determining whether the variant is represented in a significant fraction of a population. Because a subset of these reported polymorphic variants are not represented in a statistically significant portion of the population, some of them are sequencing errors and/or not biologically relevant. Thus, it is often not known whether a reported polymorphic variant is statistically significant or biologically relevant until the presence of the variant is detected in a population of individuals and the frequency of the variant is determined. Methods for detecting a polymorphic variant in a population are described herein, specifically in Example 2. A polymorphic variant is statistically significant and often biologically relevant if it is represented in 5% or more of a population, sometimes 10% or more, 15% or more, or 20% or more of a population, and often 25% or more, 30% or more, 35% or more, 40% or more, 45% or more, or 50% or more of a population.

[0023] A polymorphic variant may be detected on either or both strands of a double-stranded nucleic acid. Also, a polymorphic variant may be located within an intron or exon of a gene or within a portion of a regulatory region such as a promoter, a 5′ untranslated region (UTR), a 3′ UTR, and in DNA (*e.g.*, genomic DNA (gDNA) and complementary DNA (cDNA)), RNA (*e.g.*, mRNA, tRNA, and rRNA), or a polypeptide. Polymorphic variations may or may not result in detectable differences in gene expression, polypeptide structure, or polypeptide function.

[0024] It was determined that polymorphic variations associated with an increased risk of osteoarthritis existed in SEQ ID NO: 1-7 or a nucleotide sequence referenced in Table A. In certain embodiments, polymorphic variants at positions rs552, rs12904, rs2282146, rs734784, rs1042164, rs749670, rs955592, rs1143016, rs755248, rs1055055, rs835409, rs927663, rs8162, rs831038, rs33079, rs1710880, rs1078153, rs799570, rs1282730, rs1518875, rs1568694, rs905042, rs1957723, rs794018,

rs707723, rs893861, rs1914903, rs2062232, rs26609, rs1370987, rs1012414, rs435903, rs1248, rs703508, rs226465, rs241448, rs763155, rs1040461, rs462832, rs804194, rs1022646, rs756519, rs1042327, rs8770, rs1569112, rs1563055, rs805623, rs1019850, rs1599931, AA, rs912428, rs279941, rs1062230, rs1859911, rs1477261, rs1191119, rs657780, rs1393890, rs1478714, rs868213, rs690115, rs1465501, rs899173, rs10477, rs926393, rs465271, rs1888475, rs13847 and/or rs738658 in the human genome were associated with an increased risk of osteoarthritis, and in specific embodiments, the corresponding allele in the right-most column in Table A for each position is associated with an increased risk of osteoarthritis. In other embodiments polymorphic variants at positions rs734784, rs1042164, rs749670, rs955592, rs241448 and rs1040461 were associated with an increased risk of osteoarthritis, and in specific embodiments, a valine encoded by rs734784, a valine encoded by rs1042164, a glutamate encoded by rs749670, a threonine encoded by rs955592, a glutamine encoded by rs241448, and a glycine encoded by rs1040461 were associated with an increased risk of osteoarthritis.

[0025] Polymorphic variants in and around the *KIAA0296* locus were tested for association with osteoarthritis. These include polymorphic variants at positions in SEQ ID NO: 1 selected from the group consisting of 247, 1535, 2386, 6440, 9133, 9143, 9471, 13150, 13717, 14466, 15769, 16870, 18545, 18749, 19123, 20736, 21038, 21046, 21050, 21056, 21706, 23170, 25028, 27871, 28070, 31717, 32019, 32318, 33080, 33101, 34236, 34285, 34818, 35168, 37981, 38113, 38117, 38481, 38615, 38944, 39288, 41385, 42136, 42185, 42353, 42434, 44580, 44675, 45739, 46439, 47457, 47735, 50319, 50708, 51185, 53002, 53064, 53637, 55274, 55825, 55986, 56684, 57653, 57659, 57692, 57775, 61313, 61431, 61699, 62906, 63619, 64664, 68452, 69665, 69681, 70091, 74637, 74760, 76523, 78559, 79549, 79882, 81339, 81681, 81696, 83517, 85431, 86332, 87358, 87725, 89052, 90020, 90231, 90284, 90447, 90601, 90724, 92559, 95176, 95195 and 96822. Polymorphic variants at the following positions in SEQ ID NO: 1 in particular were associated with an increased risk of osteoarthritis: 13150, 21046, 23170, 25028, 44580, 62906, 64664 and 83517. In particular, the following polymorphic variants in SEQ ID NO: 1 were associated with risk of osteoarthritis: a guanine at position 13150, a thymine at position 21046, an adenine at position 23170, an adenine at position 25028, a guanine at position 44580, a guanine at position 62906, a cytosine at position 64664 and a cytosine at position 83517. A polymorphic variant in a *KIAA0296* polypeptide encoded by rs749670 (e.g., a glutamate at position 327 in the polypeptide) also was associated with increased risk of osteoarthritis.

[0026] Polymorphic variants in and around the *chrom 4* locus were tested for association with osteoarthritis. These include polymorphic variants at positions in SEQ ID NO: 2 selected from the group consisting of 211, 7217, 7895, 13308, 14279, 17026, 18271, 20417, 21843, 22069, 22145, 22519, 22539, 23236, 23256, 23402, 23499, 23620, 23871, 24136, 25427, 25866, 26541, 26576, 26689, 26720, 27113, 27164, 27186, 28341, 29160, 29844, 30665, 30830, 31061, 31523, 32326, 32346, 32358, 34909, 34975, 35066, 35096, 35375, 36304, 36712, 36770, 37342, 37412, 37884, 38077, 38300, 38301, 41189, 44408, 44493, 44571, 44670, 45219, 45258, 47261, 48473, 48771, 55292, 56479, 56747, 60620, 60688, 61058, 61129, 61577, 61961, 63351, 63926, 65798, 66043, 66044, 66246, 66318, 66547, 71238, 71283,

71492, 72274, 73762, 74209, 75284, 77347, 77589, 78096, 78606, 78862, 79135, 79146, 79456, 79609, 80086, 80119, 80766, 81110, 81269, 81668, 82433, 82559, 83298, 83821, 84121, 84147, 84543, 84554, 84691, 84727, 85678, 86699, 86700, 86792, 86832, 87045, 87140, 87365, 88342, 88498, 88589, 95502, 96968, 97448, 97568 and 98724. Polymorphic variants at the following positions in SEQ ID NO: 2 in particular were associated with an increased risk of osteoarthritis: 23236, 32358, 47261, 48771, 55292, 60688, 72274, 74209, 77589, 79135, 79456, 79609, 80119, 80766, 81110, 82433, 84121, 84147, 85678, 86699, 86832, 87140 and 88589, where specific embodiments are directed to a polymorphic variant at position 32358, 47261, 74209 and/or 79456. In particular, the following polymorphic variants in SEQ ID NO: 2 were associated with risk of osteoarthritis: an adenine at position 23236, a cytosine at position 32358, a guanine at position 47261, a guanine at position 48771, a cytosine at position 55292, an adenine at position 60688, a guanine at position 72274, a guanine at position 74209, a cytosine at position 77589, an adenine at position 79135, a thymine at position 79456, an adenine at position 79609, an adenine at position 80119, a cytosine at position 80766, an adenine at position 81110, a cytosine at position 82433, a cytosine at position 84121, a thymine at position 84147, a cytosine at position 85678, a thymine at position 86699, an adenine at position 86832, a guanine at position 87140 and an adenine at position 88589.

[0027] Polymorphic variants in and around the *chrom 6* region were tested for association with osteoarthritis. These include polymorphic variants at positions in SEQ ID NO: 3 selected from the group consisting of 229, 6310, 11840, 11870, 12064, 13392, 16354, 16559, 16935, 17616, 17737, 18321, 18453, 18811, 20020, 21662, 23197, 23446, 24339, 25504, 27174, 28008, 29294, 29759, 30832, 44512, 44850, 45884, 46345, 48589, 53371, 53911, 53990, 55152, 55667, 58952, 59315, 60029, 61477, 62988, 63090, 64021, 65685, 70220, 70323, 70959, 73436, 82945, 82958, 82961, 82964, 82965, 83006, 83025, 83034, 83074, 83132, 83155, 83172, 83174, 83206, 83216, 83234, 83252, 83260, 83263, 83296, 83319, 83322, 83324, 83357, 83375, 83381, 83389, 83443, 83499, 83545, 83566, 83591, 83619, 83698, 83780, 83784, 83826, 83832, 83852, 86297, 86315, 86420, 86460, 86714, 86718, 86736, 86753, 86766, 88162, 88218, 88246, 88255, 88309, 88310, 88471, 88619, 88904, 89044, 90531, 90534, 90613 and 46252. Polymorphic variants at the following positions in SEQ ID NO: 3 in particular were associated with an increased risk of osteoarthritis: 229, 6310, 16559, 18453, 25504, 27174, 30832, 44850, 45884, 48589, 61477, 82961 and 46252, with specific embodiments directed to variants at positions 229, 16559, 44850 and/or 46252. In particular, the following polymorphic variants in SEQ ID NO: 3 were associated with risk of osteoarthritis: a thymine at position 229, a guanine at position 6310, a thymine at position 16559, an adenine at position 18453, an adenine at position 25504, an adenine at position 27174, an adenine at position 30832, a guanine at position 44850, an adenine at position 45884, an adenine at position 48589, a cytosine at position 61477, a cytosine at position 82961 and a thymine at position 46252.

[0028] Polymorphic variants in and around the *ELP3* region were tested for association with osteoarthritis. These include polymorphic variants at positions in SEQ ID NO: 4 selected from the group consisting of 211, 473, 1536, 5639, 17186, 17335, 25029, 25111, 28811, 28863, 30809, 40985,

45147, 45282, 46168, 46328, 49077, 51925, 52141, 52168, 60852, 62468, 65572, 79089, 79541, 79790, 90843, 90978, 91052, 91131, 91132, 94439 and 94621. Polymorphic variants at the following positions in SEQ ID NO: 4 in particular were associated with an increased risk of osteoarthritis: 40985, 46168, 51925 and 52168. In particular, the following polymorphic variants in SEQ ID NO: 4 were associated with risk of osteoarthritis: a cytosine at position 40985, a guanine at position 46168, a thymine at position 51925 and a cytosine at position 52168.

[0029] Polymorphic variants in and around the *LRCH1* region were tested for association with osteoarthritis. These include polymorphic variants at positions in SEQ ID NO: 5 selected from the group consisting of 243, 10208, 15049, 15111, 15272, 15287, 15326, 15327, 17038, 19391, 21702, 22431, 22881, 27744, 32564, 32698, 33104, 33181, 33256, 33543, 35567, 40085, 40482, 45641, 46059, 48504, 48919, 49693, 49874, 50020, 50616, 50719, 55511, 65533, 70529, 75591, 77266, 80368, 82475, 92462, 92480, 95819 and 96275. Polymorphic variants at the following positions in SEQ ID NO: 5 in particular were associated with an increased risk of osteoarthritis: 15111, 45641, 46059, 49693, 49874, 50020, 50719, 70529, 82475, 92462, 92480 and 96275, with specific embodiments directed to variants at positions 82475 and/or 92462. In particular, the following polymorphic variants in SEQ ID NO: 5 were associated with risk of osteoarthritis: a guanine at position 15111, a thymine at position 45641, an adenine at position 46059, a cytosine at position 49693, an adenine at position 49874, an adenine at position 50020, a guanine at position 50719, an adenine at position 70529, an adenine at position 82475, a thymine at position 92462, a thymine at position 92480 and a cytosine at position 96275.

[0030] Polymorphic variants in and around the *SNW1* locus were tested for association with osteoarthritis. These include polymorphic variants at positions in SEQ ID NO: 6 selected from the group consisting of 218, 1440, 1442, 2611, 4317, 4724, 4788, 5202, 5780, 5974, 6644, 7430, 7938, 8095, 8183, 8312, 8352, 9348, 9378, 9617, 9727, 9834, 9899, 10211, 10377, 10695, 10729, 10730, 11433, 11951, 12697, 12982, 14419, 14501, 14983, 15280, 15475, 15888, 15976, 16307, 16442, 17255, 18948, 19435, 19753, 20021, 20022, 20503, 20590, 21804, 21919, 21990, 22412, 22536, 23432, 23468, 23772, 24325, 24773, 26274, 27440, 28561, 30071, 31764, 33008, 35310, 35460, 37112, 37285, 37747, 38057, 38859, 38860, 39525, 40216, 40281, 41453, 42091, 42513, 42935, 42985, 43003, 43281, 43716, 43866, 44234, 44596, 44871, 45005, 45282, 47178, 47816, 47887, 48134, 48135, 48276, 48400, 48798, 48803, 49146, 49969, 51059, 51064, 53285, 54560, 54748, 54785, 55102, 55644, 55705, 55841, 56623, 56825, 56827, 56892, 59150, 59958, 60231, 60524, 61871, 62226, 63230, 63468, 63787, 65732, 65989, 68832, 69904, 70365, 70886, 73088, 73103, 75934, 75966, 76273, 77943, 78466, 78861, 78872, 79836, 80908, 81509, 83576, 83662, 83782, 84282, 84444, 85129, 85151, 85296, 85809, 86387, 86494, 89786, 89894, 90122, 92067, 92187, 92312, 92824, 93733, 96553 and 96941. Polymorphic variants at the following positions in SEQ ID NO: 6 in particular were associated with an increased risk of osteoarthritis: 4788, 8312, 9378, 9727, 9899, 10211, 27440, 40216, 40281, 42091, 43866, 48803, 51059, 55644, 56623, 73103, 78872, 79836, 85129, 92824 and 96941. In particular, the following polymorphic variants in SEQ ID NO: 6 were associated with risk of osteoarthritis: a guanine at position 4788, a thymine at position 8312, a deletion at position 9378, a cytosine at position 9727, a guanine at

position 9899, a cytosine at position 10211, a guanine at position 27440, a guanine at position 40216, a cytosine at position 40281, an adenine at position 42091, a guanine at position 43866, an adenine at position 48803, an adenine at position 51059, an adenine at position 55644, a cytosine at position 56623, a cytosine at position 73103, an adenine at position 78872, a guanine at position 79836, a cytosine at position 85129, a guanine at position 92824 and an adenine at position 96941.

[0031] Polymorphic variants in and around the *ERG* region were tested for association with osteoarthritis. These include polymorphic variants at positions in SEQ ID NO: 7 selected from the group consisting of 231, 882, 960, 1194, 1530, 1673, 2096, 2285, 5873, 7256, 7988, 8222, 8381, 8814, 8915, 9642, 9902, 10619, 10927, 11032, 14377, 15608, 15928, 16296, 17598, 19272, 20084, 20577, 28051, 29466, 29530, 29987, 30012, 30322, 32216, 32516, 32544, 32746, 33137, 33538, 33798, 33802, 33964, 34132, 34210, 34317, 34499, 34753, 34845, 35335, 36423, 36450, 36481, 38447, 38784, 39387, 39458, 39822, 40305, 40869, 40926, 41010, 41134, 41984, 42172, 42753, 43011, 43176, 43320, 43381, 44142, 44383, 44726, 45087, 45141, 45359, 45421, 45456, 45467, 45486, 45709, 45716, 47626, 49413, 49796, 49962, 50075, 50093, 50571, 50615, 50780, 50851, 51459, 53193, 53702, 53736, 53795, 54109, 54126, 54230, 54894, 55455, 55499, 56522, 56662, 56954, 57267, 58282, 58916, 59544, 59666, 59913, 66846, 67245, 67652, 67955, 67966, 68420, 70226, 70810, 72246, 73330, 73457, 74389, 74638, 74640, 75358, 75952, 76098, 77836, 78449, 78507, 80031, 81695, 82775, 82795, 84611, 84657, 84693, 85020, 85048, 85100, 85325, 85452, 85868, 85936, 85990, 86139, 86497, 87236, 87248, 87533, 87912, 88108, 88494, 89598, 90235, 91287, 91359, 92384, 92410, 92900, 94495, 94512, 97777 and 98333.

Polymorphic variants at the following positions in SEQ ID NO: 7 in particular were associated with an increased risk of osteoarthritis: 1673, 20577, 33137, 39822, 45716, 49962, 51459, 54894, 55455, 55499, 58282, 68420 and 80031, with specific embodiments directed to variants at positions 33137, 55499 and/or 58282. In particular, the following polymorphic variants in SEQ ID NO: 7 were associated with risk of osteoarthritis: a guanine at position 1673, a thymine at position 20577, a guanine at position 33137, a guanine at position 39822, an adenine at position 45716, a guanine at position 49962, an adenine at position 51459, a cytosine at position 54894, an adenine at position 55455, an adenine at position 55499, a guanine at position 58282, an adenine at position 68420 and a thymine at position 80031.

[0032] Based in part upon analyses summarized in Figures 1A-1G, regions with significant association have been identified in regions associated with osteoarthritis. Any polymorphic variants associated with osteoarthritis in a region of significant association can be utilized for embodiments described herein. For example, polymorphic variants in a region spanning chromosome positions 31118000 to 31129000 (approximately 11,000 nucleotides in length) in a *KIAA0296* locus, a region spanning chromosome positions 36914000 to 36931000 (approximately 17,000 nucleotides in length) in a *chrom 4* region, a region spanning chromosome positions 170719500 to 170766500 (approximately 47,000 nucleotides in length) in a *chrom 6* region, a region spanning chromosome positions 27963000 to 27983000 (approximately 20,000 nucleotides in length) in an *ELP3* locus, a region spanning chromosome positions 44962000 to 45013000 (approximately 51,000 nucleotides in length) in a *LRCH1*

locus, a region spanning chromosome positions 76196500 to 76221500 (approximately 25,000 nucleotides in length) in a *SNW1* locus, and a region spanning chromosome positions 38830000 to 38844000 (approximately 14,000 nucleotides in length) in an *ERG* locus have significant association (chromosome positions are within NCBI's Genome build 34).

Additional Polymorphic Variants Associated with Osteoarthritis

[0033] Also provided is a method for identifying polymorphic variants proximal to an incident, founder polymorphic variant associated with osteoarthritis. Thus, featured herein are methods for identifying a polymorphic variation associated with osteoarthritis that is proximal to an incident polymorphic variation associated with osteoarthritis, which comprises identifying a polymorphic variant proximal to the incident polymorphic variant associated with osteoarthritis, where the incident polymorphic variant is in a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A. The nucleotide sequence often comprises a polynucleotide sequence selected from the group consisting of (a) a polynucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; (b) a polynucleotide sequence that encodes a polypeptide having an amino acid sequence encoded by a polynucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; and (c) a polynucleotide sequence that encodes a polypeptide having an amino acid sequence that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A or a polynucleotide sequence 90% or more identical to the polynucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A. The presence or absence of an association of the proximal polymorphic variant with osteoarthritis then is determined using a known association method, such as a method described in the Examples hereafter. In an embodiment, the incident polymorphic variant is a polymorphic variant associated with osteoarthritis described herein. In another embodiment, the proximal polymorphic variant identified sometimes is a publicly disclosed polymorphic variant, which for example, sometimes is published in a publicly available database. In other embodiments, the polymorphic variant identified is not publicly disclosed and is discovered using a known method, including, but not limited to, sequencing a region surrounding the incident polymorphic variant in a group of nucleic samples. Thus, multiple polymorphic variants proximal to an incident polymorphic variant are associated with osteoarthritis using this method.

[0034] The proximal polymorphic variant often is identified in a region surrounding the incident polymorphic variant. In certain embodiments, this surrounding region is about 50 kb flanking the first polymorphic variant (*e.g.* about 50 kb 5' of the first polymorphic variant and about 50 kb 3' of the first polymorphic variant), and the region sometimes is composed of shorter flanking sequences, such as flanking sequences of about 40 kb, about 30 kb, about 25 kb, about 20 kb, about 15 kb, about 10 kb, about 7 kb, about 5 kb, or about 2 kb 5' and 3' of the incident polymorphic variant. In other embodiments, the region is composed of longer flanking sequences, such as flanking sequences of about 55 kb, about 60 kb, about 65 kb, about 70 kb, about 75 kb, about 80 kb, about 85 kb, about 90 kb, about 95 kb, or about 100 kb 5' and 3' of the incident polymorphic variant.

[0035] In certain embodiments, polymorphic variants associated with osteoarthritis are identified iteratively. For example, a first proximal polymorphic variant is associated with osteoarthritis using the methods described above and then another polymorphic variant proximal to the first proximal polymorphic variant is identified (*e.g.*, publicly disclosed or discovered) and the presence or absence of an association of one or more other polymorphic variants proximal to the first proximal polymorphic variant with osteoarthritis is determined.

[0036] The methods described herein are useful for identifying or discovering additional polymorphic variants that may be used to further characterize a gene, region or loci associated with a condition, a disease (*e.g.*, osteoarthritis), or a disorder. For example, allelotyping or genotyping data from the additional polymorphic variants may be used to identify a functional mutation or a region of linkage disequilibrium. In certain embodiments, polymorphic variants identified or discovered within a region comprising the first polymorphic variant associated with osteoarthritis are genotyped using the genetic methods and sample selection techniques described herein, and it can be determined whether those polymorphic variants are in linkage disequilibrium with the first polymorphic variant. The size of the region in linkage disequilibrium with the first polymorphic variant also can be assessed using these genotyping methods. Thus, provided herein are methods for determining whether a polymorphic variant is in linkage disequilibrium with a first polymorphic variant associated with osteoarthritis, and such information can be used in prognosis/diagnosis methods described herein.

Isolated Nucleic Acids

[0037] Featured herein are isolated *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid variants depicted in SEQ ID NO: 1-7 or referenced in Table A, and substantially identical nucleic acids thereof. A nucleic acid variant may be represented on one or both strands in a double-stranded nucleic acid or on one chromosomal complement (heterozygous) or both chromosomal complements (homozygous).

[0038] As used herein, the term “nucleic acid” includes DNA molecules (*e.g.*, a complementary DNA (cDNA) and genomic DNA (gDNA)) and RNA molecules (*e.g.*, mRNA, rRNA, siRNA and tRNA) and analogs of DNA or RNA, for example, by use of nucleotide analogs. The nucleic acid molecule can be single-stranded and it is often double-stranded. The term “isolated or purified nucleic acid” refers to nucleic acids that are separated from other nucleic acids present in the natural source of the nucleic acid. For example, with regard to genomic DNA, the term “isolated” includes nucleic acids which are separated from the chromosome with which the genomic DNA is naturally associated. An “isolated” nucleic acid is often free of sequences which naturally flank the nucleic acid (*i.e.*, sequences located at the 5' and/or 3' ends of the nucleic acid) in the genomic DNA of the organism from which the nucleic acid is derived. For example, in various embodiments, the isolated nucleic acid molecule can contain less than about 5 kb, 4 kb, 3 kb, 2 kb, 1 kb, 0.5 kb or 0.1 kb of 5' and/or 3' nucleotide sequences which flank the nucleic acid molecule in genomic DNA of the cell from which the nucleic acid is derived. Moreover, an “isolated” nucleic acid molecule, such as a cDNA molecule, can be substantially

free of other cellular material, or culture medium when produced by recombinant techniques, or substantially free of chemical precursors or other chemicals when chemically synthesized. As used herein, the term “gene” refers to a nucleotide sequence that encodes a polypeptide.

[0039] Also included herein are nucleic acid fragments. These fragments often have a nucleotide sequence identical to a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A, a nucleotide sequence substantially identical to a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A, or a nucleotide sequence that is complementary to the foregoing. The nucleic acid fragment may be identical, substantially identical or homologous to a nucleotide sequence in an exon or an intron in a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A, and may encode a domain or part of a domain of a polypeptide. Sometimes, the fragment will comprises one or more of the polymorphic variations described herein as being associated with osteoarthritis. The nucleic acid fragment is often 50, 100, or 200 or fewer base pairs in length, and is sometimes about 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 2000, 3000, 4000, 5000, 10000, 15000, or 20000 base pairs in length. A nucleic acid fragment that is complementary to a nucleotide sequence identical or substantially identical to a nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A and hybridizes to such a nucleotide sequence under stringent conditions is often referred to as a “probe.” Nucleic acid fragments often include one or more polymorphic sites, or sometimes have an end that is adjacent to a polymorphic site as described hereafter.

[0040] An example of a nucleic acid fragment is an oligonucleotide. As used herein, the term “oligonucleotide” refers to a nucleic acid comprising about 8 to about 50 covalently linked nucleotides, often comprising from about 8 to about 35 nucleotides, and more often from about 10 to about 25 nucleotides. The backbone and nucleotides within an oligonucleotide may be the same as those of naturally occurring nucleic acids, or analogs or derivatives of naturally occurring nucleic acids, provided that oligonucleotides having such analogs or derivatives retain the ability to hybridize specifically to a nucleic acid comprising a targeted polymorphism. Oligonucleotides described herein may be used as hybridization probes or as components of prognostic or diagnostic assays, for example, as described herein.

[0041] Oligonucleotides are typically synthesized using standard methods and equipment, such as the ABI™3900 High Throughput DNA Synthesizer and the EXPEDITE™ 8909 Nucleic Acid Synthesizer, both of which are available from Applied Biosystems (Foster City, CA). Analogs and derivatives are exemplified in U.S. Pat. Nos. 4,469,863; 5,536,821; 5,541,306; 5,637,683; 5,637,684; 5,700,922; 5,717,083; 5,719,262; 5,739,308; 5,773,601; 5,886,165; 5,929,226; 5,977,296; 6,140,482; WO 00/56746; WO 01/14398, and related publications. Methods for synthesizing oligonucleotides comprising such analogs or derivatives are disclosed, for example, in the patent publications cited above and in U.S. Pat. Nos. 5,614,622; 5,739,314; 5,955,599; 5,962,674; 6,117,992; in WO 00/75372; and in related publications.

[0042] Oligonucleotides may also be linked to a second moiety. The second moiety may be an additional nucleotide sequence such as a tail sequence (*e.g.*, a polyadenosine tail), an adapter sequence

(e.g., phage M13 universal tail sequence), and others. Alternatively, the second moiety may be a non-nucleotide moiety such as a moiety which facilitates linkage to a solid support or a label to facilitate detection of the oligonucleotide. Such labels include, without limitation, a radioactive label, a fluorescent label, a chemiluminescent label, a paramagnetic label, and the like. The second moiety may be attached to any position of the oligonucleotide, provided the oligonucleotide can hybridize to the nucleic acid comprising the polymorphism.

Uses for Nucleic Acid Sequence

[0043] Nucleic acid coding sequences may be used for diagnostic purposes for detection and control of polypeptide expression. Also, included herein are oligonucleotide sequences such as antisense RNA, small-interfering RNA (siRNA) and DNA molecules and ribozymes that function to inhibit translation of a polypeptide. Antisense techniques and RNA interference techniques are known in the art and are described herein.

[0044] Ribozymes are enzymatic RNA molecules capable of catalyzing the specific cleavage of RNA. The mechanism of ribozyme action involves sequence specific hybridization of the ribozyme molecule to complementary target RNA, followed by endonucleolytic cleavage. For example, hammerhead motif ribozyme molecules may be engineered that specifically and efficiently catalyze endonucleolytic cleavage of RNA sequences corresponding to or complementary to *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequences or other nucleotide sequences referenced in Table A. Specific ribozyme cleavage sites within any potential RNA target are initially identified by scanning the target molecule for ribozyme cleavage sites which include the following sequences, GUA, GUU and GUC. Once identified, short RNA sequences of between fifteen (15) and twenty (20) ribonucleotides corresponding to the region of the target gene containing the cleavage site may be evaluated for predicted structural features such as secondary structure that may render the oligonucleotide sequence unsuitable. The suitability of candidate targets may also be evaluated by testing their accessibility to hybridization with complementary oligonucleotides, using ribonuclease protection assays.

[0045] Antisense RNA and DNA molecules, siRNA and ribozymes may be prepared by any method known in the art for the synthesis of RNA molecules. These include techniques for chemically synthesizing oligodeoxyribonucleotides well known in the art such as solid phase phosphoramidite chemical synthesis. Alternatively, RNA molecules may be generated by *in vitro* and *in vivo* transcription of DNA sequences encoding the antisense RNA molecule. Such DNA sequences may be incorporated into a wide variety of vectors which incorporate suitable RNA polymerase promoters such as the T7 or SP6 polymerase promoters. Alternatively, antisense cDNA constructs that synthesize antisense RNA constitutively or inducibly, depending on the promoter used, can be introduced stably into cell lines.

[0046] DNA encoding a polypeptide also may have a number of uses for the diagnosis of diseases, including osteoarthritis, resulting from aberrant expression of a target gene described herein. For

example, the nucleic acid sequence may be used in hybridization assays of biopsies or autopsies to diagnose abnormalities of expression or function (e.g., Southern or Northern blot analysis, in situ hybridization assays).

[0047] In addition, the expression of a polypeptide during embryonic development may also be determined using nucleic acid encoding the polypeptide. As addressed, *infra*, production of functionally impaired polypeptide is the cause of various disease states, such as osteoarthritis. *In situ* hybridizations using polypeptide as a probe may be employed to predict problems related to osteoarthritis. Further, as indicated, *infra*, administration of human active polypeptide, recombinantly produced as described herein, may be used to treat disease states related to functionally impaired polypeptide. Alternatively, gene therapy approaches may be employed to remedy deficiencies of functional polypeptide or to replace or compete with dysfunctional polypeptide.

Expression Vectors, Host Cells, and Genetically Engineered Cells

[0048] Provided herein are nucleic acid vectors, often expression vectors, which contain a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A, or a substantially identical sequence thereof. As used herein, the term “vector” refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked and can include a plasmid, cosmid, or viral vector. The vector can be capable of autonomous replication or it can integrate into a host DNA. Viral vectors may include replication defective retroviruses, adenoviruses and adeno-associated viruses for example.

[0049] A vector can include a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A in a form suitable for expression of an encoded target polypeptide or target nucleic acid in a host cell. A “target polypeptide” is a polypeptide encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A, or a substantially identical nucleotide sequence thereof. The recombinant expression vector typically includes one or more regulatory sequences operatively linked to the nucleic acid sequence to be expressed. The term “regulatory sequence” includes promoters, enhancers and other expression control elements (e.g., polyadenylation signals). Regulatory sequences include those that direct constitutive expression of a nucleotide sequence, as well as tissue-specific regulatory and/or inducible sequences. The design of the expression vector can depend on such factors as the choice of the host cell to be transformed, the level of expression of polypeptide desired, and the like. Expression vectors can be introduced into host cells to produce target polypeptides, including fusion polypeptides.

[0050] Recombinant expression vectors can be designed for expression of target polypeptides in prokaryotic or eukaryotic cells. For example, target polypeptides can be expressed in *E. coli*, insect cells (e.g., using baculovirus expression vectors), yeast cells, or mammalian cells. Suitable host cells are discussed further in Goeddel, *Gene Expression Technology: Methods in Enzymology 185*, Academic Press, San Diego, CA (1990). Alternatively, the recombinant expression vector can be

transcribed and translated *in vitro*, for example using T7 promoter regulatory sequences and T7 polymerase.

[0051] Expression of polypeptides in prokaryotes is most often carried out in *E. coli* with vectors containing constitutive or inducible promoters directing the expression of either fusion or non-fusion polypeptides. Fusion vectors add a number of amino acids to a polypeptide encoded therein, usually to the amino terminus of the recombinant polypeptide. Such fusion vectors typically serve three purposes: 1) to increase expression of recombinant polypeptide; 2) to increase the solubility of the recombinant polypeptide; and 3) to aid in the purification of the recombinant polypeptide by acting as a ligand in affinity purification. Often, a proteolytic cleavage site is introduced at the junction of the fusion moiety and the recombinant polypeptide to enable separation of the recombinant polypeptide from the fusion moiety subsequent to purification of the fusion polypeptide. Such enzymes, and their cognate recognition sequences, include Factor Xa, thrombin and enterokinase. Typical fusion expression vectors include pGEX (Pharmacia Biotech Inc; Smith & Johnson, *Gene* 67: 31-40 (1988)), pMAL (New England Biolabs, Beverly, MA) and pRIT5 (Pharmacia, Piscataway, NJ) which fuse glutathione S-transferase (GST), maltose E binding polypeptide, or polypeptide A, respectively, to the target recombinant polypeptide.

[0052] Purified fusion polypeptides can be used in screening assays and to generate antibodies specific for target polypeptides. In a therapeutic embodiment, fusion polypeptide expressed in a retroviral expression vector is used to infect bone marrow cells that are subsequently transplanted into irradiated recipients. The pathology of the subject recipient is then examined after sufficient time has passed (*e.g.*, six (6) weeks).

[0053] Expressing the polypeptide in host bacteria with an impaired capacity to proteolytically cleave the recombinant polypeptide is often used to maximize recombinant polypeptide expression (Gottesman, S., *Gene Expression Technology: Methods in Enzymology*, Academic Press, San Diego, California 185: 119-128 (1990)). Another strategy is to alter the nucleotide sequence of the nucleic acid to be inserted into an expression vector so that the individual codons for each amino acid are those preferentially utilized in *E. coli* (Wada *et al.*, *Nucleic Acids Res.* 20: 2111-2118 (1992)). Such alteration of nucleotide sequences can be carried out by standard DNA synthesis techniques.

[0054] When used in mammalian cells, the expression vector's control functions are often provided by viral regulatory elements. For example, commonly used promoters are derived from polyoma, Adenovirus 2, cytomegalovirus and Simian Virus 40. Recombinant mammalian expression vectors are often capable of directing expression of the nucleic acid in a particular cell type (*e.g.*, tissue-specific regulatory elements are used to express the nucleic acid). Non-limiting examples of suitable tissue-specific promoters include an albumin promoter (liver-specific; Pinkert *et al.*, *Genes Dev.* 1: 268-277 (1987)), lymphoid-specific promoters (Calame & Eaton, *Adv. Immunol.* 43: 235-275 (1988)), promoters of T cell receptors (Winoto & Baltimore, *EMBO J.* 8: 729-733 (1989)) promoters of immunoglobulins (Banerji *et al.*, *Cell* 33: 729-740 (1983); Queen & Baltimore, *Cell* 33: 741-748 (1983)), neuron-specific promoters (*e.g.*, the neurofilament promoter; Byrne & Ruddie, *Proc. Natl.*

Acad. Sci. USA 86: 5473-5477 (1989)), pancreas-specific promoters (Edlund *et al.*, *Science* 230: 912-916 (1985)), and mammary gland-specific promoters (*e.g.*, milk whey promoter; U.S. Patent No. 4,873,316 and European Application Publication No. 264,166). Developmentally-regulated promoters are sometimes utilized, for example, the murine hox promoters (Kessel & Gruss, *Science* 249: 374-379 (1990)) and the α -fetopolypeptide promoter (Campes & Tilghman, *Genes Dev.* 3: 537-546 (1989)).

[0055] A *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A also may be cloned into an expression vector in an antisense orientation. Regulatory sequences (*e.g.*, viral promoters and/or enhancers) operatively linked to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A cloned in the antisense orientation can be chosen for directing constitutive, tissue specific or cell type specific expression of antisense RNA in a variety of cell types. Antisense expression vectors can be in the form of a recombinant plasmid, phagemid or attenuated virus. For a discussion of the regulation of gene expression using antisense genes *see, e.g.*, Weintraub *et al.*, Antisense RNA as a molecular tool for genetic analysis, *Reviews - Trends in Genetics*, Vol. 1(1) (1986).

[0056] Also provided herein are host cells that include a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A within a recombinant expression vector or a fragment of such a nucleotide sequence which facilitate homologous recombination into a specific site of the host cell genome. The terms "host cell" and "recombinant host cell" are used interchangeably herein. Such terms refer not only to the particular subject cell but rather also to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein. A host cell can be any prokaryotic or eukaryotic cell. For example, a target polypeptide can be expressed in bacterial cells such as *E. coli*, insect cells, yeast or mammalian cells (such as Chinese hamster ovary cells (CHO) or COS cells). Other suitable host cells are known to those skilled in the art.

[0057] Vectors can be introduced into host cells via conventional transformation or transfection techniques. As used herein, the terms "transformation" and "transfection" are intended to refer to a variety of art-recognized techniques for introducing foreign nucleic acid (*e.g.*, DNA) into a host cell, including calcium phosphate or calcium chloride co-precipitation, transduction/infection, DEAE-dextran-mediated transfection, lipofection, or electroporation.

[0058] A host cell provided herein can be used to produce (*i.e.*, express) a target polypeptide or a substantially identical polypeptide thereof. Accordingly, further provided are methods for producing a target polypeptide using host cells described herein. In one embodiment, the method includes culturing host cells into which a recombinant expression vector encoding a target polypeptide has been introduced in a suitable medium such that a target polypeptide is produced. In another embodiment, the method further includes isolating a target polypeptide from the medium or the host cell.

[0059] Also provided are cells or purified preparations of cells which include a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* transgene, or other transgene in Table A, or which otherwise misexpress target polypeptide. Cell preparations can consist of human or non-human cells, *e.g.*, rodent cells, *e.g.*, mouse or rat cells, rabbit cells, or pig cells. In preferred embodiments, the cell or cells include a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* transgene or other transgene referenced in Table A (*e.g.*, a heterologous form of a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* gene or other gene referenced in Table A, such as a human gene expressed in non-human cells). The transgene can be misexpressed, *e.g.*, overexpressed or underexpressed. In other preferred embodiments, the cell or cells include a gene which misexpress an endogenous target polypeptide (*e.g.*, expression of a gene is disrupted, also known as a knockout). Such cells can serve as a model for studying disorders which are related to mutated or mis-expressed alleles or for use in drug screening. Also provided are human cells (*e.g.*, a hematopoietic stem cells) transfected with a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A.

[0060] Also provided are cells or a purified preparation thereof (*e.g.*, human cells) in which an endogenous *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A is under the control of a regulatory sequence that does not normally control the expression of the endogenous gene. The expression characteristics of an endogenous gene within a cell (*e.g.*, a cell line or microorganism) can be modified by inserting a heterologous DNA regulatory element into the genome of the cell such that the inserted regulatory element is operably linked to the corresponding endogenous gene. For example, an endogenous corresponding gene (*e.g.*, a gene which is “transcriptionally silent,” not normally expressed, or expressed only at very low levels) may be activated by inserting a regulatory element which is capable of promoting the expression of a normally expressed gene product in that cell. Techniques such as targeted homologous recombinations, can be used to insert the heterologous DNA as described in, *e.g.*, Chappel, US 5,272,071; WO 91/06667, published on May 16, 1991.

Transgenic Animals

[0061] Non-human transgenic animals that express a heterologous target polypeptide (*e.g.*, expressed from a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A, or substantially identical sequence thereof) can be generated. Such animals are useful for studying the function and/or activity of a target polypeptide and for identifying and/or evaluating modulators of the activity of *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acids, other nucleic acids referenced in Table A, and encoded polypeptides. As used herein, a “transgenic animal” is a non-human animal such as a mammal (*e.g.*, a non-human primate such as chimpanzee, baboon, or macaque; an ungulate such as an equine, bovine, or caprine; or a rodent such as a rat, a mouse, or an Israeli sand rat), a bird (*e.g.*, a chicken or a turkey), an amphibian (*e.g.*, a frog, salamander, or newt), or an insect (*e.g.*, *Drosophila melanogaster*), in which one or more of the cells of the animal includes a transgene. A transgene is exogenous DNA or a rearrangement (*e.g.*, a deletion of

endogenous chromosomal DNA) that is often integrated into or occurs in the genome of cells in a transgenic animal. A transgene can direct expression of an encoded gene product in one or more cell types or tissues of the transgenic animal, and other transgenes can reduce expression (*e.g.*, a knockout). Thus, a transgenic animal can be one in which an endogenous nucleic acid homologous to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A has been altered by homologous recombination between the endogenous gene and an exogenous DNA molecule introduced into a cell of the animal (*e.g.*, an embryonic cell of the animal) prior to development of the animal.

[0062] Intronic sequences and polyadenylation signals can also be included in the transgene to increase expression efficiency of the transgene. One or more tissue-specific regulatory sequences can be operably linked to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A to direct expression of an encoded polypeptide to particular cells. A transgenic founder animal can be identified based upon the presence of a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A in its genome and/or expression of encoded mRNA in tissues or cells of the animals. A transgenic founder animal can then be used to breed additional animals carrying the transgene. Moreover, transgenic animals carrying a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A can further be bred to other transgenic animals carrying other transgenes.

[0063] Target polypeptides can be expressed in transgenic animals or plants by introducing, for example, a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A into the genome of an animal that encodes the target polypeptide. In preferred embodiments the nucleic acid is placed under the control of a tissue specific promoter, *e.g.*, a milk or egg specific promoter, and recovered from the milk or eggs produced by the animal. Also included is a population of cells from a transgenic animal.

Target Polypeptides

[0064] Also featured herein are isolated target polypeptides, which are encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or a nucleotide sequence referenced in Table A (*e.g.*, SEQ ID NO: 8-17 or a sequence referenced in Table A), or a substantially identical nucleotide sequence thereof. Examples of *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* polypeptides are set forth in SEQ ID NO: 18-27. The term “polypeptide” as used herein includes proteins and peptides. An “isolated” or “purified” polypeptide or protein is substantially free of cellular material or other contaminating proteins from the cell or tissue source from which the protein is derived, or substantially free from chemical precursors or other chemicals when chemically synthesized. In one embodiment, the language “substantially free” means preparation of a target polypeptide having less than about 30%, 20%, 10% and more preferably 5% (by dry weight), of non-target polypeptide (also referred to herein as a “contaminating protein”), or of chemical precursors or

non-target chemicals. When the target polypeptide or a biologically active portion thereof is recombinantly produced, it is also preferably substantially free of culture medium, specifically, where culture medium represents less than about 20%, sometimes less than about 10%, and often less than about 5% of the volume of the polypeptide preparation. Isolated or purified target polypeptide preparations are sometimes 0.01 milligrams or more or 0.1 milligrams or more, and often 1.0 milligrams or more and 10 milligrams or more in dry weight.

[0065] Further included herein are target polypeptide fragments. The polypeptide fragment may be a domain or part of a domain of a target polypeptide. The polypeptide fragment may have increased, decreased or unexpected biological activity. The polypeptide fragment is often 50 or fewer, 100 or fewer, or 200 or fewer amino acids in length, and is sometimes 300, 400, 500, 600, 700, or 900 or fewer amino acids in length. Specific embodiments are directed to a *PTPN1* polypeptide fragment (*e.g.*, rs2282146 in Table A), such as a catalytic domain starting at about amino acid 3 and ending at about amino acid 279. Other embodiments are directed to a *KCNS1* polypeptide fragment (*e.g.*, rs734784 in Table A), such as a voltage gated potassium ion channel domain (*e.g.*, starting at about amino acid 21 and ending at about amino acid 509), a potassium channel tetramerization domain (*e.g.*, starting at about amino acid 52 and ending at about amino acid 155) or an ion transport protein domain (*e.g.*, starting at about amino acid 271 and ending at about amino acid 456), for example. Certain embodiments are directed to *PSMB1* polypeptide fragments (*e.g.*, sequence accessed by NP_002784; rs756519 in Table A), such as a proteasome protease domain (*e.g.*, starting at about amino acid 34 and ending at about amino acid 226) or a proteasome B domain (*e.g.*, starting at about amino acid 41 and ending at about amino acid 88). Certain embodiments are directed to a *ANXA6* polypeptide fragment (*e.g.*, rs1012414 in Table A), such as an annexin domain starting at about amino acid 5 and ending at about amino acid 325, an annexin domain starting at about amino acid 179 and ending at about amino acid 507, or an annexin domain starting at about amino acid 355 and ending at about amino acid 673 in isoform 1 or isoform 2 (*e.g.*, an isoform 1 sequence can be accessed using accession number NP_001146 and an isoform 2 sequence can be accessed using accession number NP_004024; isoform 2 lacks exon 21 and encodes a protein isoform lacking the six amino acids VAAEIL). Amino acid sequences can be accessed using information in Table A and in SEQ ID NO: 18-27.

[0066] Substantially identical target polypeptides may depart from the amino acid sequences of target polypeptides in different manners. For example, conservative amino acid modifications may be introduced at one or more positions in the amino acid sequences of target polypeptides. A “conservative amino acid substitution” is one in which the amino acid is replaced by another amino acid having a similar structure and/or chemical function. Families of amino acid residues having similar structures and functions are well known. These families include amino acids with basic side chains (*e.g.*, lysine, arginine, histidine), acidic side chains (*e.g.*, aspartic acid, glutamic acid), uncharged polar side chains (*e.g.*, glycine, asparagine, glutamine, serine, threonine, tyrosine, cysteine), nonpolar side chains (*e.g.*, alanine, valine, leucine, isoleucine, proline, phenylalanine, methionine, tryptophan), beta-branched side chains (*e.g.*, threonine, valine, isoleucine) and aromatic side chains (*e.g.*, tyrosine, phenylalanine,

tryptophan, histidine). Also, essential and non-essential amino acids may be replaced. A “non-essential” amino acid is one that can be altered without abolishing or substantially altering the biological function of a target polypeptide, whereas altering an “essential” amino acid abolishes or substantially alters the biological function of a target polypeptide. Amino acids that are conserved among target polypeptides are typically essential amino acids. In certain embodiments, the polypeptide includes one or more non-synonymous polymorphic variants associated with osteoarthritis, as described above (*e.g.*, a valine encoded by rs734784, a valine encoded by rs1042164, a glutamate encoded by rs749670, a threonine encoded by rs955592, a glutamine encoded by rs241448, and a glycine encoded by rs1040461).

[0067] Also, target polypeptides may exist as chimeric or fusion polypeptides. As used herein, a target “chimeric polypeptide” or target “fusion polypeptide” includes a target polypeptide linked to a non-target polypeptide. A “non-target polypeptide” refers to a polypeptide having an amino acid sequence corresponding to a polypeptide which is not substantially identical to the target polypeptide, which includes, for example, a polypeptide that is different from the target polypeptide and derived from the same or a different organism. The target polypeptide in the fusion polypeptide can correspond to an entire or nearly entire target polypeptide or a fragment thereof. The non-target polypeptide can be fused to the N-terminus or C-terminus of the target polypeptide.

[0068] Fusion polypeptides can include a moiety having high affinity for a ligand. For example, the fusion polypeptide can be a GST-target fusion polypeptide in which the target sequences are fused to the C-terminus of the GST sequences, or a polyhistidine-target fusion polypeptide in which the target polypeptide is fused at the N- or C-terminus to a string of histidine residues. Such fusion polypeptides can facilitate purification of recombinant target polypeptide. Expression vectors are commercially available that already encode a fusion moiety (*e.g.*, a GST polypeptide), and a nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A, or a substantially identical nucleotide sequence thereof, can be cloned into an expression vector such that the fusion moiety is linked in-frame to the target polypeptide. Further, the fusion polypeptide can be a target polypeptide containing a heterologous signal sequence at its N-terminus. In certain host cells (*e.g.*, mammalian host cells), expression, secretion, cellular internalization, and cellular localization of a target polypeptide can be increased through use of a heterologous signal sequence. Fusion polypeptides can also include all or a part of a serum polypeptide (*e.g.*, an IgG constant region or human serum albumin).

[0069] Target polypeptides can be incorporated into pharmaceutical compositions and administered to a subject *in vivo*. Administration of these target polypeptides can be used to affect the bioavailability of a substrate of the target polypeptide and may effectively increase target polypeptide biological activity in a cell. Target fusion polypeptides may be useful therapeutically for the treatment of disorders caused by, for example, (i) aberrant modification or mutation of a gene encoding a target polypeptide; (ii) mis-regulation of the gene encoding the target polypeptide; and (iii) aberrant post-translational modification of a target polypeptide. Also, target polypeptides can be used as immunogens to produce anti-target antibodies in a subject, to purify target polypeptide ligands or binding partners,

and in screening assays to identify molecules which inhibit or enhance the interaction of a target polypeptide with a substrate.

[0070] In addition, polypeptides can be chemically synthesized using techniques known in the art (See, *e.g.*, Creighton, 1983 Proteins. New York, N.Y.: W. H. Freeman and Company; and Hunkapiller et al., (1984) Nature July 12 -18;310(5973):105-11). For example, a relative short fragment can be synthesized by use of a peptide synthesizer. Furthermore, if desired, non-classical amino acids or chemical amino acid analogs can be introduced as a substitution or addition into the fragment sequence. Non-classical amino acids include, but are not limited to, to the D-isomers of the common amino acids, 2,4-diaminobutyric acid, α -amino isobutyric acid, 4-aminobutyric acid, Abu, 2-amino butyric acid, γ -Abu, ϵ -Ahx, 6-amino hexanoic acid, Aib, 2-amino isobutyric acid, 3-amino propionic acid, ornithine, norleucine, norvaline, hydroxyproline, sarcosine, citrulline, homocitrulline, cysteic acid, t-butylglycine, t-butylalanine, phenylglycine, cyclohexylalanine, b-alanine, fluoroamino acids, designer amino acids such as b-methyl amino acids, Ca-methyl amino acids, Na-methyl amino acids, and amino acid analogs in general. Furthermore, the amino acid can be D (dextrorotary) or L (levorotary).

[0071] Polypeptides and polypeptide fragments sometimes are differentially modified during or after translation, *e.g.*, by glycosylation, acetylation, phosphorylation, amidation, derivatization by known protecting/blocking groups, proteolytic cleavage, linkage to an antibody molecule or other cellular ligand, etc. Any of numerous chemical modifications may be carried out by known techniques, including but not limited, to specific chemical cleavage by cyanogen bromide, trypsin, chymotrypsin, papain, V8 protease, NaBH₄; acetylation, formylation, oxidation, reduction; metabolic synthesis in the presence of tunicamycin; and the like. Additional post-translational modifications include, for example, N-linked or O-linked carbohydrate chains, processing of N-terminal or C-terminal ends), attachment of chemical moieties to the amino acid backbone, chemical modifications of N-linked or O-linked carbohydrate chains, and addition or deletion of an N-terminal methionine residue as a result of prokaryotic host cell expression. The polypeptide fragments may also be modified with a detectable label, such as an enzymatic, fluorescent, isotopic or affinity label to allow for detection and isolation of the polypeptide.

[0072] Also provided are chemically modified derivatives of polypeptides that can provide additional advantages such as increased solubility, stability and circulating time of the polypeptide, or decreased immunogenicity (*see e.g.*, U.S. Pat. No: 4,179,337. The chemical moieties for derivitization may be selected from water soluble polymers such as polyethylene glycol, ethylene glycol/propylene glycol copolymers, carboxymethylcellulose, dextran, polyvinyl alcohol and the like. The polypeptides may be modified at random positions within the molecule, or at predetermined positions within the molecule and may include one, two, three or more attached chemical moieties.

[0073] The polymer may be of any molecular weight, and may be branched or unbranched. For polyethylene glycol, the preferred molecular weight is between about 1 kDa and about 100 kDa (the term "about" indicating that in preparations of polyethylene glycol, some molecules will weigh more, some less, than the stated molecular weight) for ease in handling and manufacturing. Other sizes may be

used, depending on the desired therapeutic profile (*e.g.*, the duration of sustained release desired, the effects, if any on biological activity, the ease in handling, the degree or lack of antigenicity and other known effects of the polyethylene glycol to a therapeutic protein or analog).

[0074] The polymers should be attached to the polypeptide with consideration of effects on functional or antigenic domains of the polypeptide. There are a number of attachment methods available to those skilled in the art (*e.g.*, EP 0 401 384 (coupling PEG to G-CSF) and Malik et al. (1992) *Exp Hematol.* September;20(8):1028-35 (pegylation of GM-CSF using tresyl chloride)). For example, polyethylene glycol may be covalently bound through amino acid residues via a reactive group, such as a free amino or carboxyl group. Reactive groups are those to which an activated polyethylene glycol molecule may be bound. The amino acid residues having a free amino group may include lysine residues and the N-terminal amino acid residues; those having a free carboxyl group may include aspartic acid residues, glutamic acid residues and the C-terminal amino acid residue. Sulfhydryl groups may also be used as a reactive group for attaching the polyethylene glycol molecules. For therapeutic purposes, the attachment sometimes is at an amino group, such as attachment at the N-terminus or lysine group.

[0075] Proteins can be chemically modified at the N-terminus. Using polyethylene glycol as an illustration of such a composition, one may select from a variety of polyethylene glycol molecules (by molecular weight, branching, and the like), the proportion of polyethylene glycol molecules to protein (polypeptide) molecules in the reaction mix, the type of pegylation reaction to be performed, and the method of obtaining the selected N-terminally pegylated protein. The method of obtaining the N-terminally pegylated preparation (*i.e.*, separating this moiety from other monopegylated moieties if necessary) may be by purification of the N-terminally pegylated material from a population of pegylated protein molecules. Selective proteins chemically modified at the N-terminus may be accomplished by reductive alkylation, which exploits differential reactivity of different types of primary amino groups (lysine versus the N-terminal) available for derivatization in a particular protein. Under the appropriate reaction conditions, substantially selective derivatization of the protein at the N-terminus with a carbonyl group containing polymer is achieved.

Substantially Identical Nucleic Acids and Polypeptides

[0076] Nucleotide sequences and polypeptide sequences that are substantially identical to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A and the target polypeptide sequences encoded by those nucleotide sequences, respectively, are included herein. The term “substantially identical” as used herein refers to two or more nucleic acids or polypeptides sharing one or more identical nucleotide sequences or polypeptide sequences, respectively. Included are nucleotide sequences or polypeptide sequences that are 55% or more, 60% or more, 65% or more, 70% or more, 75% or more, 80% or more, 85% or more, 90% or more, 95% or more (each often within a 1%, 2%, 3% or 4% variability) identical to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence, or other nucleotide

sequence referenced in Table A, or the encoded target polypeptide amino acid sequences. One test for determining whether two nucleic acids are substantially identical is to determine the percent of identical nucleotide sequences or polypeptide sequences shared between the nucleic acids or polypeptides.

[0077] Calculations of sequence identity are often performed as follows. Sequences are aligned for optimal comparison purposes (*e.g.*, gaps can be introduced in one or both of a first and a second amino acid or nucleic acid sequence for optimal alignment and non-homologous sequences can be disregarded for comparison purposes). The length of a reference sequence aligned for comparison purposes is sometimes 30% or more, 40% or more, 50% or more, often 60% or more, and more often 70% or more, 80% or more, 90% or more, or 100% of the length of the reference sequence. The nucleotides or amino acids at corresponding nucleotide or polypeptide positions, respectively, are then compared among the two sequences. When a position in the first sequence is occupied by the same nucleotide or amino acid as the corresponding position in the second sequence, the nucleotides or amino acids are deemed to be identical at that position. The percent identity between the two sequences is a function of the number of identical positions shared by the sequences, taking into account the number of gaps, and the length of each gap, introduced for optimal alignment of the two sequences.

[0078] Comparison of sequences and determination of percent identity between two sequences can be accomplished using a mathematical algorithm. Percent identity between two amino acid or nucleotide sequences can be determined using the algorithm of Meyers & Miller, *CABIOS* 4: 11-17 (1989), which has been incorporated into the ALIGN program (version 2.0), using a PAM120 weight residue table, a gap length penalty of 12 and a gap penalty of 4. Also, percent identity between two amino acid sequences can be determined using the Needleman & Wunsch, *J. Mol. Biol.* 48: 444-453 (1970) algorithm which has been incorporated into the GAP program in the GCG software package (available at the [http](http://www.gcg.com) address www.gcg.com), using either a Blossum 62 matrix or a PAM250 matrix, and a gap weight of 16, 14, 12, 10, 8, 6, or 4 and a length weight of 1, 2, 3, 4, 5, or 6. Percent identity between two nucleotide sequences can be determined using the GAP program in the GCG software package (available at [http](http://www.gcg.com) address www.gcg.com), using a NWSgapdna.CMP matrix and a gap weight of 40, 50, 60, 70, or 80 and a length weight of 1, 2, 3, 4, 5, or 6. A set of parameters often used is a Blossum 62 scoring matrix with a gap open penalty of 12, a gap extend penalty of 4, and a frameshift gap penalty of 5.

[0079] Another manner for determining if two nucleic acids are substantially identical is to assess whether a polynucleotide homologous to one nucleic acid will hybridize to the other nucleic acid under stringent conditions. As use herein, the term "stringent conditions" refers to conditions for hybridization and washing. Stringent conditions are known to those skilled in the art and can be found in *Current Protocols in Molecular Biology*, John Wiley & Sons, N.Y., 6.3.1-6.3.6 (1989). Aqueous and non-aqueous methods are described in that reference and either can be used. An example of stringent hybridization conditions is hybridization in 6X sodium chloride/sodium citrate (SSC) at about 45°C, followed by one or more washes in 0.2X SSC, 0.1% SDS at 50°C. Another example of stringent hybridization conditions are hybridization in 6X sodium chloride/sodium citrate (SSC) at about 45°C,

followed by one or more washes in 0.2X SSC, 0.1% SDS at 55°C. A further example of stringent hybridization conditions is hybridization in 6X sodium chloride/sodium citrate (SSC) at about 45°C, followed by one or more washes in 0.2X SSC, 0.1% SDS at 60°C. Often, stringent hybridization conditions are hybridization in 6X sodium chloride/sodium citrate (SSC) at about 45°C, followed by one or more washes in 0.2X SSC, 0.1% SDS at 65°C. More often, stringency conditions are 0.5M sodium phosphate, 7% SDS at 65°C, followed by one or more washes at 0.2X SSC, 1% SDS at 65°C.

[0080] An example of a substantially identical nucleotide sequence to a nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A is one that has a different nucleotide sequence but still encodes the same polypeptide sequence encoded by the nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A. Another example is a nucleotide sequence that encodes a polypeptide having a polypeptide sequence that is more than 70% or more identical to, sometimes more than 75% or more, 80% or more, or 85% or more identical to, and often more than 90% or more and 95% or more identical to a polypeptide sequence encoded by a nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A.

[0081] Nucleotide sequences in SEQ ID NO: 1-7 or referenced in Table A and amino acid sequences of encoded polypeptides can be used as “query sequences” to perform a search against public databases to identify other family members or related sequences, for example. Such searches can be performed using the NBLAST and XBLAST programs (version 2.0) of Altschul *et al.*, *J. Mol. Biol.* 215: 403-10 (1990). BLAST nucleotide searches can be performed with the NBLAST program, score = 100, wordlength = 12 to obtain nucleotide sequences homologous to nucleotide sequences in SEQ ID NO: 1-7, SEQ ID NO: 8-17 or referenced in Table A. BLAST polypeptide searches can be performed with the XBLAST program, score = 50, wordlength = 3 to obtain amino acid sequences homologous to polypeptides encoded by the nucleotide sequences of SEQ ID NO: 8-17 or referenced in Table A. To obtain gapped alignments for comparison purposes, Gapped BLAST can be utilized as described in Altschul *et al.*, *Nucleic Acids Res.* 25(17): 3389-3402 (1997). When utilizing BLAST and Gapped BLAST programs, default parameters of the respective programs (*e.g.*, XBLAST and NBLAST) can be used (*see* the http address www.ncbi.nlm.nih.gov).

[0082] A nucleic acid that is substantially identical to a nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A may include polymorphic sites at positions equivalent to those described herein when the sequences are aligned. For example, using the alignment procedures described herein, SNPs in a sequence substantially identical to a sequence in SEQ ID NO: 1-7 or referenced in Table A can be identified at nucleotide positions that match (*i.e.*, align) with nucleotides at SNP positions in each nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A. Also, where a polymorphic variation results in an insertion or deletion, insertion or deletion of a nucleotide sequence from a reference sequence can change the relative positions of other polymorphic sites in the nucleotide sequence.

[0083] Substantially identical nucleotide and polypeptide sequences include those that are naturally occurring, such as allelic variants (same locus), splice variants, homologs (different locus), and

orthologs (different organism) or can be non-naturally occurring. Non-naturally occurring variants can be generated by mutagenesis techniques, including those applied to polynucleotides, cells, or organisms. The variants can contain nucleotide substitutions, deletions, inversions and insertions. Variation can occur in either or both the coding and non-coding regions. The variations can produce both conservative and non-conservative amino acid substitutions (as compared in the encoded product). Orthologs, homologs, allelic variants, and splice variants can be identified using methods known in the art. These variants normally comprise a nucleotide sequence encoding a polypeptide that is 50% or more, about 55% or more, often about 70-75% or more or about 80-85% or more, and sometimes about 90-95% or more identical to the amino acid sequences of target polypeptides or a fragment thereof. Such nucleic acid molecules can readily be identified as being able to hybridize under stringent conditions to a nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A or a fragment of this sequence. Nucleic acid molecules corresponding to orthologs, homologs, and allelic variants of a nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A can further be identified by mapping the sequence to the same chromosome or locus as the nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A.

[0084] Also, substantially identical nucleotide sequences may include codons that are altered with respect to the naturally occurring sequence for enhancing expression of a target polypeptide in a particular expression system. For example, the nucleic acid can be one in which one or more codons are altered, and often 10% or more or 20% or more of the codons are altered for optimized expression in bacteria (*e.g.*, *E. coli.*), yeast (*e.g.*, *S. cerevisiae*), human (*e.g.*, 293 cells), insect, or rodent (*e.g.*, hamster) cells.

Methods for Identifying Risk of Osteoarthritis

[0085] Methods for prognosing and diagnosing osteoarthritis are included herein. These methods include detecting the presence or absence of one or more polymorphic variations in a nucleotide sequence associated with osteoarthritis, such as variants in or around the loci set forth herein, or a substantially identical sequence thereof, in a sample from a subject, where the presence of a polymorphic variant described herein is indicative of a risk of osteoarthritis. Determining a risk of osteoarthritis sometimes refers to determining whether an individual is at an increased risk of osteoarthritis (*e.g.*, intermediate risk or higher risk).

[0086] Thus, featured herein is a method for identifying a subject who is at risk of osteoarthritis, which comprises detecting an aberration associated with osteoarthritis in a nucleic acid sample from the subject. An embodiment is a method for detecting a risk of osteoarthritis in a subject, which comprises detecting the presence or absence of a polymorphic variation associated with osteoarthritis at a polymorphic site in a nucleotide sequence in a nucleic acid sample from a subject, where the nucleotide sequence comprises a polynucleotide sequence selected from the group consisting of: (a) a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; (b) a nucleotide sequence which encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO: 1-7

or referenced in Table A; (c) a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A, or a nucleotide sequence about 90% or more identical to a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; and (d) a fragment of a nucleotide sequence of (a), (b), or (c) comprising the polymorphic site; whereby the presence of the polymorphic variation is indicative of a predisposition to osteoarthritis in the subject. In certain embodiments, polymorphic variants at the positions described herein are detected for determining a risk of osteoarthritis, and polymorphic variants at positions in linkage disequilibrium with these positions are detected for determining a risk of osteoarthritis. As used herein, the terms “SEQ ID NO: 1-7” and other nucleotide sequences “referenced in Table A” refers to individual sequences in SEQ ID NO: 1, 2, 3, 4, 5, 6 or 7, or any individual sequence referenced in Table A, each sequence being separately applicable to embodiments described herein.

[0087] Risk of osteoarthritis sometimes is expressed as a probability, such as an odds ratio, percentage, or risk factor. Risk often is based upon the presence or absence of one or more polymorphic variants described herein, and also may be based in part upon phenotypic traits of the individual being tested. Methods for calculating risk based upon patient data are well known (*see, e.g.*, Agresti, *Categorical Data Analysis*, 2nd Ed. 2002. Wiley). Allelotyping and genotyping analyses may be carried out in populations other than those exemplified herein to enhance the predictive power of the prognostic method. These further analyses are executed in view of the exemplified procedures described herein, and may be based upon the same polymorphic variations or additional polymorphic variations.

[0088] In certain embodiments, determining the presence of a combination of two or more polymorphic variants associated with osteoarthritis in one or more genetic loci (*e.g.*, one or more genes) of the sample is determined to identify, quantify and/or estimate, risk of osteoarthritis. The risk often is the probability of having or developing osteoarthritis. The risk sometimes is expressed as a relative risk with respect to a population average risk of osteoarthritis, and sometimes is expressed as a relative risk with respect to the lowest risk group. Such relative risk assessments often are based upon penetrance values determined by statistical methods, and are particularly useful to clinicians and insurance companies for assessing risk of osteoarthritis (*e.g.*, a clinician can target appropriate detection, prevention and therapeutic regimens to a patient after determining the patient's risk of osteoarthritis, and an insurance company can fine tune actuarial tables based upon population genotype assessments of osteoarthritis risk). Risk of osteoarthritis sometimes is expressed as an odds ratio, which is the odds of a particular person having a genotype has or will develop osteoarthritis with respect to another genotype group (*e.g.*, the most disease protective genotype or population average). In related embodiments, the determination is utilized to identify a subject at risk of osteoarthritis. In an embodiment, two or more polymorphic variations are detected in two or more regions in human genomic DNA associated with increased risk of osteoarthritis, such as a locus containing a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* or other locus referenced in Table A, for example. In certain embodiments, 3 or

more, or 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 80, 90, 100 or more polymorphic variants are detected in the sample. In specific embodiments, polymorphic variants are detected in a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* region or other region referenced in Table A, for example. In another embodiment, polymorphic variants are detected at two or three positions in a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A. In certain embodiments, polymorphic variants are detected at other genetic loci (*e.g.*, the polymorphic variants can be detected in a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A in addition to other loci or only in other loci), where the other loci include but are not limited to those described in patent applications 60/559,011; 60/559,202; 60/559,203; 60/559,042; 60/559,275; 60/559,040 and 60/559,225, each of which is entitled “Methods for Identifying Risk of Osteoarthritis and Treatments Thereof,” each of which was filed on 1 April 2004 and each of which is incorporated herein by reference in its entirety in jurisdictions allowing incorporation by reference.

[0089] Results from prognostic tests may be combined with other test results to diagnose osteoarthritis. For example, prognostic results may be gathered, a patient sample may be ordered based on a determined predisposition to osteoarthritis, the patient sample is analyzed, and the results of the analysis may be utilized to diagnose osteoarthritis. Also osteoarthritis diagnostic method can be developed from studies used to generate prognostic methods in which populations are stratified into subpopulations having different progressions of osteoarthritis. In another embodiment, prognostic results may be gathered, a patient’s risk factors for developing osteoarthritis (*e.g.*, age, weight, occupational history, race, diet) analyzed, and a patient sample may be ordered based on a determined predisposition to osteoarthritis.

[0090] The nucleic acid sample typically is isolated from a biological sample obtained from a subject. For example, nucleic acid can be isolated from blood, saliva, sputum, urine, cell scrapings, and biopsy tissue. The nucleic acid sample can be isolated from a biological sample using standard techniques, such as the technique described in Example 2. As used herein, the term “subject” refers primarily to humans but also refers to other mammals such as dogs, cats, and ungulates (*e.g.*, cattle, sheep, and swine). Subjects also include avians (*e.g.*, chickens and turkeys), reptiles, and fish (*e.g.*, salmon), as embodiments described herein can be adapted to nucleic acid samples isolated from any of these organisms. The nucleic acid sample may be isolated from the subject and then directly utilized in a method for determining the presence of a polymorphic variant, or alternatively, the sample may be isolated and then stored (*e.g.*, frozen) for a period of time before being subjected to analysis.

[0091] The presence or absence of a polymorphic variant is determined using one or both chromosomal complements represented in the nucleic acid sample. Determining the presence or absence of a polymorphic variant in both chromosomal complements represented in a nucleic acid sample from a subject having a copy of each chromosome is useful for determining the zygosity of an individual for the polymorphic variant (*i.e.*, whether the individual is homozygous or heterozygous for the polymorphic variant). Any oligonucleotide-based diagnostic may be utilized to determine whether a

sample includes the presence or absence of a polymorphic variant in a sample. For example, primer extension methods, ligase sequence determination methods (*e.g.*, U.S. Pat. Nos. 5,679,524 and 5,952,174, and WO 01/27326), mismatch sequence determination methods (*e.g.*, U.S. Pat. Nos. 5,851,770; 5,958,692; 6,110,684; and 6,183,958), microarray sequence determination methods, restriction fragment length polymorphism (RFLP), single strand conformation polymorphism detection (SSCP) (*e.g.*, U.S. Pat. Nos. 5,891,625 and 6,013,499), PCR-based assays (*e.g.*, TAQMAN[®] PCR System (Applied Biosystems)), and nucleotide sequencing methods may be used.

[0092] Oligonucleotide extension methods typically involve providing a pair of oligonucleotide primers in a polymerase chain reaction (PCR) or in other nucleic acid amplification methods for the purpose of amplifying a region from the nucleic acid sample that comprises the polymorphic variation. One oligonucleotide primer is complementary to a region 3' of the polymorphism and the other is complementary to a region 5' of the polymorphism. A PCR primer pair may be used in methods disclosed in U.S. Pat. Nos. 4,683,195; 4,683,202, 4,965,188; 5,656,493; 5,998,143; 6,140,054; WO 01/27327; and WO 01/27329 for example. PCR primer pairs may also be used in any commercially available machines that perform PCR, such as any of the GENEAMP[®] Systems available from Applied Biosystems. Also, those of ordinary skill in the art will be able to design oligonucleotide primers based upon a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A using knowledge available in the art.

[0093] Also provided is an extension oligonucleotide that hybridizes to the amplified fragment adjacent to the polymorphic variation. As used herein, the term "adjacent" refers to the 3' end of the extension oligonucleotide being often 1 nucleotide from the 5' end of the polymorphic site, and sometimes 2, 3, 4, 5, 6, 7, 8, 9, or 10 nucleotides from the 5' end of the polymorphic site, in the nucleic acid when the extension oligonucleotide is hybridized to the nucleic acid. The extension oligonucleotide then is extended by one or more nucleotides, and the number and/or type of nucleotides that are added to the extension oligonucleotide determine whether the polymorphic variant is present. Oligonucleotide extension methods are disclosed, for example, in U.S. Pat. Nos. 4,656,127; 4,851,331; 5,679,524; 5,834,189; 5,876,934; 5,908,755; 5,912,118; 5,976,802; 5,981,186; 6,004,744; 6,013,431; 6,017,702; 6,046,005; 6,087,095; 6,210,891; and WO 01/20039. Oligonucleotide extension methods using mass spectrometry are described, for example, in U.S. Pat. Nos. 5,547,835; 5,605,798; 5,691,141; 5,849,542; 5,869,242; 5,928,906; 6,043,031; and 6,194,144, and a method often utilized is described herein in Example 2.

[0094] A microarray can be utilized for determining whether a polymorphic variant is present or absent in a nucleic acid sample. A microarray may include any oligonucleotides described herein, and methods for making and using oligonucleotide microarrays suitable for diagnostic use are disclosed in U.S. Pat. Nos. 5,492,806; 5,525,464; 5,589,330; 5,695,940; 5,849,483; 6,018,041; 6,045,996; 6,136,541; 6,142,681; 6,156,501; 6,197,506; 6,223,127; 6,225,625; 6,229,911; 6,239,273; WO 00/52625; WO 01/25485; and WO 01/29259. The microarray typically comprises a solid support and the oligonucleotides may be linked to this solid support by covalent bonds or by non-covalent

interactions. The oligonucleotides may also be linked to the solid support directly or by a spacer molecule. A microarray may comprise one or more oligonucleotides complementary to a polymorphic site set forth herein.

[0095] A kit also may be utilized for determining whether a polymorphic variant is present or absent in a nucleic acid sample. A kit often comprises one or more pairs of oligonucleotide primers useful for amplifying a fragment of a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A or a substantially identical sequence thereof, where the fragment includes a polymorphic site. The kit sometimes comprises a polymerizing agent, for example, a thermostable nucleic acid polymerase such as one disclosed in U.S. Pat. Nos. 4,889,818 or 6,077,664. Also, the kit often comprises an elongation oligonucleotide that hybridizes to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A in a nucleic acid sample adjacent to the polymorphic site. Where the kit includes an elongation oligonucleotide, it also often comprises chain elongating nucleotides, such as dATP, dTTP, dGTP, dCTP, and dITP, including analogs of dATP, dTTP, dGTP, dCTP and dITP, provided that such analogs are substrates for a thermostable nucleic acid polymerase and can be incorporated into a nucleic acid chain elongated from the extension oligonucleotide. Along with chain elongating nucleotides would be one or more chain terminating nucleotides such as ddATP, ddTTP, ddGTP, ddCTP, and the like. In an embodiment, the kit comprises one or more oligonucleotide primer pairs, a polymerizing agent, chain elongating nucleotides, at least one elongation oligonucleotide, and one or more chain terminating nucleotides. Kits optionally include buffers, vials, microtiter plates, and instructions for use.

[0096] An individual identified as being at risk of osteoarthritis may be heterozygous or homozygous with respect to the allele associated with a higher risk of osteoarthritis. A subject homozygous for an allele associated with an increased risk of osteoarthritis is at a comparatively high risk of osteoarthritis, a subject heterozygous for an allele associated with an increased risk of osteoarthritis is at a comparatively intermediate risk of osteoarthritis, and a subject homozygous for an allele associated with a decreased risk of osteoarthritis is at a comparatively low risk of osteoarthritis. A genotype may be assessed for a complementary strand, such that the complementary nucleotide at a particular position is detected.

[0097] Also featured are methods for determining risk of osteoarthritis and/or identifying a subject at risk of osteoarthritis by contacting a polypeptide or protein encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A from a subject with an antibody that specifically binds to an epitope associated with increased risk of osteoarthritis in the polypeptide.

Applications of Prognostic and Diagnostic Results to Pharmacogenomic Methods

[0098] Pharmacogenomics is a discipline that involves tailoring a treatment for a subject according to the subject's genotype as a particular treatment regimen may exert a differential effect depending upon the subject's genotype. For example, based upon the outcome of a prognostic test described

herein, a clinician or physician may target pertinent information and preventative or therapeutic treatments to a subject who would be benefited by the information or treatment and avoid directing such information and treatments to a subject who would not be benefited (*e.g.*, the treatment has no therapeutic effect and/or the subject experiences adverse side effects).

[0099] The following is an example of a pharmacogenomic embodiment. A particular treatment regimen can exert a differential effect depending upon the subject's genotype. Where a candidate therapeutic exhibits a significant interaction with a major allele and a comparatively weak interaction with a minor allele (*e.g.*, an order of magnitude or greater difference in the interaction), such a therapeutic typically would not be administered to a subject genotyped as being homozygous for the minor allele, and sometimes not administered to a subject genotyped as being heterozygous for the minor allele. In another example, where a candidate therapeutic is not significantly toxic when administered to subjects who are homozygous for a major allele but is comparatively toxic when administered to subjects heterozygous or homozygous for a minor allele, the candidate therapeutic is not typically administered to subjects who are genotyped as being heterozygous or homozygous with respect to the minor allele.

[0100] The methods described herein are applicable to pharmacogenomic methods for preventing, alleviating or treating osteoarthritis. For example, a nucleic acid sample from an individual may be subjected to a prognostic test described herein. Where one or more polymorphic variations associated with increased risk of osteoarthritis are identified in a subject, information for preventing or treating osteoarthritis and/or one or more osteoarthritis treatment regimens then may be prescribed to that subject.

[0101] In certain embodiments, a treatment or preventative regimen is specifically prescribed and/or administered to individuals who will most benefit from it based upon their risk of developing osteoarthritis assessed by the methods described herein. Thus, provided are methods for identifying a subject predisposed to osteoarthritis and then prescribing a therapeutic or preventative regimen to individuals identified as having a predisposition. Thus, certain embodiments are directed to a method for reducing osteoarthritis in a subject, which comprises: detecting the presence or absence of a polymorphic variant associated with osteoarthritis in a nucleotide sequence in a nucleic acid sample from a subject, where the nucleotide sequence comprises a polynucleotide sequence selected from the group consisting of: (a) a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; (b) a nucleotide sequence which encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; (c) a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A, or a nucleotide sequence about 90% or more identical to a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; and (d) a fragment of a polynucleotide sequence of (a), (b), or (c); and prescribing or administering a treatment regimen to a subject from whom the sample originated where the presence of a polymorphic variation associated

with osteoarthritis is detected in the nucleotide sequence. In these methods, predisposition results may be utilized in combination with other test results to diagnose osteoarthritis.

[0102] Certain preventative treatments often are prescribed to subjects having a predisposition to osteoarthritis and where the subject is diagnosed with osteoarthritis or is diagnosed as having symptoms indicative of an early stage of osteoarthritis. The treatment sometimes is preventative (*e.g.*, is prescribed or administered to reduce the probability that osteoarthritis arises or progresses), sometimes is therapeutic, and sometimes delays, alleviates or halts the progression of osteoarthritis. Any known preventative or therapeutic treatment for alleviating or preventing the occurrence of osteoarthritis is prescribed and/or administered. For example, the treatment often is directed to decreasing pain and improving joint movement. Examples of OA treatments include exercises to keep joints flexible and improve muscle strength. Different medications to control pain, including corticosteroids and nonsteroidal anti-inflammatory drugs (NSAIDs, *e.g.*, Voltaren); cyclooxygenase-2 (COX-2) inhibitors (*e.g.*, Celebrex, Vioxx, Mobic, and Bextra); monoclonal antibodies (*e.g.*, Remicade); tumor necrosis factor inhibitors (*e.g.*, Enbrel); or injections of glucocorticoids, hyaluronic acid or chondroitin sulfate into joints that are inflamed and not responsive to NSAIDs. Orally administered chondroitin sulfate also may be used as a therapeutic, as it may increase hyaluronic acid levels and viscosity of synovial fluid, and decrease collagenase levels in synovial fluid. Also, glucosamine can serve as an OA therapeutic as delivering it into joints may inhibit enzymes involved in cartilage degradation and enhance the production of hyaluronic acid. For mild pain without inflammation, acetaminophen may be used. Other treatments include: heat/cold therapy for temporary pain relief; joint protection to prevent strain or stress on painful joints; surgery to relieve chronic pain in damaged joints; and weight control to prevent extra stress on weight-bearing joints.

[0103] As therapeutic approaches for treating osteoarthritis continue to evolve and improve, the goal of treatments for osteoarthritis related disorders is to intervene even before clinical signs first manifest. Thus, genetic markers associated with susceptibility to osteoarthritis prove useful for early diagnosis, prevention and treatment of osteoarthritis.

[0104] As osteoarthritis preventative and treatment information can be specifically targeted to subjects in need thereof (*e.g.*, those at risk of developing osteoarthritis or those in an early stage of osteoarthritis), provided herein is a method for preventing or reducing the risk of developing osteoarthritis in a subject, which comprises: (a) detecting the presence or absence of a polymorphic variation associated with osteoarthritis at a polymorphic site in a nucleotide sequence in a nucleic acid sample from a subject; (b) identifying a subject with a predisposition to osteoarthritis, whereby the presence of the polymorphic variation is indicative of a predisposition to osteoarthritis in the subject; and (c) if such a predisposition is identified, providing the subject with information about methods or products to prevent or reduce osteoarthritis or to delay the onset of osteoarthritis. Also provided is a method of targeting information or advertising to a subpopulation of a human population based on the subpopulation being genetically predisposed to a disease or condition, which comprises: (a) detecting the presence or absence of a polymorphic variation associated with osteoarthritis at a polymorphic site

in a nucleotide sequence in a nucleic acid sample from a subject; (b) identifying the subpopulation of subjects in which the polymorphic variation is associated with osteoarthritis; and (c) providing information only to the subpopulation of subjects about a particular product which may be obtained and consumed or applied by the subject to help prevent or delay onset of the disease or condition.

[0105] Pharmacogenomics methods also may be used to analyze and predict a response to osteoarthritis treatment or a drug. For example, if pharmacogenomics analysis indicates a likelihood that an individual will respond positively to osteoarthritis treatment with a particular drug, the drug may be administered to the individual. Conversely, if the analysis indicates that an individual is likely to respond negatively to treatment with a particular drug, an alternative course of treatment may be prescribed. A negative response may be defined as either the absence of an efficacious response or the presence of toxic side effects. The response to a therapeutic treatment can be predicted in a background study in which subjects in any of the following populations are genotyped: a population that responds favorably to a treatment regimen, a population that does not respond significantly to a treatment regimen, and a population that responds adversely to a treatment regimen (*e.g.*, exhibits one or more side effects). These populations are provided as examples and other populations and subpopulations may be analyzed. Based upon the results of these analyses, a subject is genotyped to predict whether he or she will respond favorably to a treatment regimen, not respond significantly to a treatment regimen, or respond adversely to a treatment regimen.

[0106] The tests described herein also are applicable to clinical drug trials. One or more polymorphic variants indicative of response to an agent for treating osteoarthritis or to side effects to an agent for treating osteoarthritis may be identified using the methods described herein. Thereafter, potential participants in clinical trials of such an agent may be screened to identify those individuals most likely to respond favorably to the drug and exclude those likely to experience side effects. In that way, the effectiveness of drug treatment may be measured in individuals who respond positively to the drug, without lowering the measurement as a result of the inclusion of individuals who are unlikely to respond positively in the study and without risking undesirable safety problems.

[0107] Thus, another embodiment is a method of selecting an individual for inclusion in a clinical trial of a treatment or drug comprising the steps of: (a) obtaining a nucleic acid sample from an individual; (b) determining the identity of a polymorphic variation which is associated with a positive response to the treatment or the drug, or at least one polymorphic variation which is associated with a negative response to the treatment or the drug in the nucleic acid sample, and (c) including the individual in the clinical trial if the nucleic acid sample contains said polymorphic variation associated with a positive response to the treatment or the drug or if the nucleic acid sample lacks said polymorphic variation associated with a negative response to the treatment or the drug. In addition, the methods described herein for selecting an individual for inclusion in a clinical trial of a treatment or drug encompass methods with any further limitation described in this disclosure, or those following, specified alone or in any combination. The polymorphic variation may be in a sequence selected individually or in any combination from the group consisting of (i) a nucleotide sequence of SEQ ID

NO: 1-7 or referenced in Table A; (ii) a nucleotide sequence which encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; (iii) a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A, or a nucleotide sequence about 90% or more identical to a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A; and (iv) a fragment of a polynucleotide sequence of (i), (ii), or (iii) comprising the polymorphic site. The including step (c) optionally comprises administering the drug or the treatment to the individual if the nucleic acid sample contains the polymorphic variation associated with a positive response to the treatment or the drug and the nucleic acid sample lacks said biallelic marker associated with a negative response to the treatment or the drug.

[0108] Also provided herein is a method of partnering between a diagnostic/prognostic testing provider and a provider of a consumable product, which comprises: (a) the diagnostic/prognostic testing provider detects the presence or absence of a polymorphic variation associated with osteoarthritis at a polymorphic site in a nucleotide sequence in a nucleic acid sample from a subject; (b) the diagnostic/prognostic testing provider identifies the subpopulation of subjects in which the polymorphic variation is associated with osteoarthritis; (c) the diagnostic/prognostic testing provider forwards information to the subpopulation of subjects about a particular product which may be obtained and consumed or applied by the subject to help prevent or delay onset of the disease or condition; and (d) the provider of a consumable product forwards to the diagnostic test provider a fee every time the diagnostic/prognostic test provider forwards information to the subject as set forth in step (c) above.

Compositions Comprising Osteoarthritis-Directed Molecules

[0109] Featured herein is a composition comprising a cell from a subject having osteoarthritis or at risk of osteoarthritis and one or more molecules specifically directed and targeted to a nucleic acid comprising a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence, other nucleotide sequence referenced in Table A, or an encoded amino acid sequence. Such directed molecules include, but are not limited to, a compound that binds to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence, or other nucleotide sequence referenced in Table A, or encoded amino acid sequence; a RNAi or siRNA molecule having a strand complementary or substantially complementary to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A (e.g., hybridizes to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A under conditions of high stringency); an antisense nucleic acid complementary or substantially complementary to an RNA encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A (e.g., hybridizes to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A under conditions of high stringency); a ribozyme that hybridizes to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide

sequence or other nucleotide sequence referenced in Table A (*e.g.*, hybridizes to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A under conditions of high stringency); a nucleic acid aptamer that specifically binds a polypeptide encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A; and an antibody that specifically binds to a polypeptide encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A or binds to a nucleic acid having such a nucleotide sequence. In an embodiment, the antibody selectively binds to an epitope comprising an amino acid encoded by rs734784, rs1042164, rs749670, rs955592, rs241448 and rs1040461. In specific embodiments, the osteoarthritis directed molecule interacts with a nucleic acid or polypeptide variant associated with osteoarthritis, such as variants referenced herein. In other embodiments, the osteoarthritis directed molecule interacts with a polypeptide involved in a signal pathway of a polypeptide encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A, or a nucleic acid comprising such a nucleotide sequence.

[0110] Compositions sometimes include an adjuvant known to stimulate an immune response, and in certain embodiments, an adjuvant that stimulates a T-cell lymphocyte response. Adjuvants are known, including but not limited to an aluminum adjuvant (*e.g.*, aluminum hydroxide); a cytokine adjuvant or adjuvant that stimulates a cytokine response (*e.g.*, interleukin (IL)-12 and/or gamma-interferon cytokines); a Freund-type mineral oil adjuvant emulsion (*e.g.*, Freund's complete or incomplete adjuvant); a synthetic lipoid compound; a copolymer adjuvant (*e.g.*, TitreMax); a saponin; Quil A; a liposome; an oil-in-water emulsion (*e.g.*, an emulsion stabilized by Tween 80 and pluronic polyoxyethylene/polyoxypropylene block copolymer (Syntex Adjuvant Formulation); TitreMax; detoxified endotoxin (MPL) and mycobacterial cell wall components (TDW, CWS) in 2% squalene (Ribi Adjuvant System)); a muramyl dipeptide; an immune-stimulating complex (ISCOM, *e.g.*, an Ag-modified saponin/cholesterol micelle that forms stable cage-like structure); an aqueous phase adjuvant that does not have a depot effect (*e.g.*, Gerbu adjuvant); a carbohydrate polymer (*e.g.*, AdjuPrime); L-tyrosine; a manide-oleate compound (*e.g.*, Montanide); an ethylene-vinyl acetate copolymer (*e.g.*, Elvax 40W1,2); or lipid A, for example. Such compositions are useful for generating an immune response against osteoarthritis directed molecule (*e.g.*, an HLA-binding subsequence within a polypeptide encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence). In such methods, a peptide having an amino acid subsequence of a polypeptide encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence is delivered to a subject, where the subsequence binds to an HLA molecule and induces a CTL lymphocyte response. The peptide sometimes is delivered to the subject as an isolated peptide or as a minigene in a plasmid that encodes the peptide. Methods for identifying HLA-binding subsequences in such polypeptides are known (see *e.g.*, publication WO02/20616 and PCT application US98/01373 for methods of identifying such sequences).

[0111] The cell may be in a group of cells cultured *in vitro* or in a tissue maintained *in vitro* or present in an animal *in vivo* (e.g., a rat, mouse, ape or human). In certain embodiments, a composition comprises a component from a cell such as a nucleic acid molecule (e.g., genomic DNA), a protein mixture or isolated protein, for example. The aforementioned compositions have utility in diagnostic, prognostic and pharmacogenomic methods described previously and in therapeutics described hereafter. Certain osteoarthritis directed molecules are described in greater detail below.

Compounds

[0112] Compounds can be obtained using any of the numerous approaches in combinatorial library methods known in the art, including: biological libraries; peptoid libraries (libraries of molecules having the functionalities of peptides, but with a novel, non-peptide backbone which are resistant to enzymatic degradation but which nevertheless remain bioactive (see, e.g., Zuckermann et al., J. Med. Chem. 37: 2678-85 (1994)); spatially addressable parallel solid phase or solution phase libraries; synthetic library methods requiring deconvolution; "one-bead one-compound" library methods; and synthetic library methods using affinity chromatography selection. Biological library and peptoid library approaches are typically limited to peptide libraries, while the other approaches are applicable to peptide, non-peptide oligomer or small molecule libraries of compounds (Lam, Anticancer Drug Des. 12: 145, (1997)). Examples of methods for synthesizing molecular libraries are described, for example, in DeWitt et al., Proc. Natl. Acad. Sci. U.S.A. 90: 6909 (1993); Erb et al., Proc. Natl. Acad. Sci. USA 91: 11422 (1994); Zuckermann et al., J. Med. Chem. 37: 2678 (1994); Cho et al., Science 261: 1303 (1993); Carrell et al., Angew. Chem. Int. Ed. Engl. 33: 2059 (1994); Carell et al., Angew. Chem. Int. Ed. Engl. 33: 2061 (1994); and in Gallop et al., J. Med. Chem. 37: 1233 (1994).

[0113] Libraries of compounds may be presented in solution (e.g., Houghten, Biotechniques 13: 412-421 (1992)), or on beads (Lam, Nature 354: 82-84 (1991)), chips (Fodor, Nature 364: 555-556 (1993)), bacteria or spores (Ladner, United States Patent No. 5,223,409), plasmids (Cull et al., Proc. Natl. Acad. Sci. USA 89: 1865-1869 (1992)) or on phage (Scott and Smith, Science 249: 386-390 (1990); Devlin, Science 249: 404-406 (1990); Cwirla et al., Proc. Natl. Acad. Sci. 87: 6378-6382 (1990); Felici, J. Mol. Biol. 222: 301-310 (1991); Ladner supra.).

[0114] A compound sometimes alters expression and sometimes alters activity of a polypeptide target and may be a small molecule. Small molecules include, but are not limited to, peptides, peptidomimetics (e.g., peptoids), amino acids, amino acid analogs, polynucleotides, polynucleotide analogs, nucleotides, nucleotide analogs, organic or inorganic compounds (i.e., including heteroorganic and organometallic compounds) having a molecular weight less than about 10,000 grams per mole, organic or inorganic compounds having a molecular weight less than about 5,000 grams per mole, organic or inorganic compounds having a molecular weight less than about 1,000 grams per mole, organic or inorganic compounds having a molecular weight less than about 500 grams per mole, and salts, esters, and other pharmaceutically acceptable forms of such compounds.

Antisense Nucleic Acid Molecules, Ribozymes, RNAi, siRNA and Modified Nucleic Acid Molecules

[0115] An “antisense” nucleic acid refers to a nucleotide sequence complementary to a “sense” nucleic acid encoding a polypeptide, *e.g.*, complementary to the coding strand of a double-stranded cDNA molecule or complementary to an mRNA sequence. The antisense nucleic acid can be complementary to an entire coding strand, or to a portion thereof or a substantially identical sequence thereof. In another embodiment, the antisense nucleic acid molecule is antisense to a “noncoding region” of the coding strand of a nucleotide sequence (*e.g.*, 5’ and 3’ untranslated regions in SEQ ID NO: 1-7 or a nucleotide sequence referenced in Table A).

[0116] An antisense nucleic acid can be designed such that it is complementary to the entire coding region of an mRNA encoded by a nucleotide sequence (*e.g.*, SEQ ID NO: 1-7, SEQ ID NO: 8-17 or a nucleotide sequence referenced in Table A), and often the antisense nucleic acid is an oligonucleotide antisense to only a portion of a coding or noncoding region of the mRNA. For example, the antisense oligonucleotide can be complementary to the region surrounding the translation start site of the mRNA, *e.g.*, between the -10 and +10 regions of the target gene nucleotide sequence of interest. An antisense oligonucleotide can be, for example, about 7, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, or more nucleotides in length. The antisense nucleic acids, which include the ribozymes described hereafter, can be designed to target a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence, often a variant associated with osteoarthritis, or a substantially identical sequence thereof. Among the variants, minor alleles and major alleles can be targeted, and those associated with a higher risk of osteoarthritis are often designed, tested, and administered to subjects.

[0117] An antisense nucleic acid can be constructed using chemical synthesis and enzymatic ligation reactions using standard procedures. For example, an antisense nucleic acid (*e.g.*, an antisense oligonucleotide) can be chemically synthesized using naturally occurring nucleotides or variously modified nucleotides designed to increase the biological stability of the molecules or to increase the physical stability of the duplex formed between the antisense and sense nucleic acids, *e.g.*, phosphorothioate derivatives and acridine substituted nucleotides can be used. Antisense nucleic acid also can be produced biologically using an expression vector into which a nucleic acid has been subcloned in an antisense orientation (*i.e.*, RNA transcribed from the inserted nucleic acid will be of an antisense orientation to a target nucleic acid of interest, described further in the following subsection).

[0118] When utilized as therapeutics, antisense nucleic acids typically are administered to a subject (*e.g.*, by direct injection at a tissue site) or generated in situ such that they hybridize with or bind to cellular mRNA and/or genomic DNA encoding a polypeptide and thereby inhibit expression of the polypeptide, for example, by inhibiting transcription and/or translation. Alternatively, antisense nucleic acid molecules can be modified to target selected cells and then are administered systemically. For systemic administration, antisense molecules can be modified such that they specifically bind to receptors or antigens expressed on a selected cell surface, for example, by linking antisense nucleic acid molecules to peptides or antibodies which bind to cell surface receptors or antigens. Antisense nucleic

acid molecules can also be delivered to cells using the vectors described herein. Sufficient intracellular concentrations of antisense molecules are achieved by incorporating a strong promoter, such as a pol II or pol III promoter, in the vector construct.

[0119] Antisense nucleic acid molecules sometimes are alpha-anomeric nucleic acid molecules. An alpha-anomeric nucleic acid molecule forms specific double-stranded hybrids with complementary RNA in which, contrary to the usual beta-units, the strands run parallel to each other (Gaultier et al., *Nucleic Acids. Res.* 15: 6625-6641 (1987)). Antisense nucleic acid molecules can also comprise a 2'-O-methylribonucleotide (Inoue et al., *Nucleic Acids Res.* 15: 6131-6148 (1987)) or a chimeric RNA-DNA analogue (Inoue et al., *FEBS Lett.* 215: 327-330 (1987)). Antisense nucleic acids sometimes are composed of DNA or PNA or any other nucleic acid derivatives described previously.

[0120] In another embodiment, an antisense nucleic acid is a ribozyme. A ribozyme having specificity for a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A can include one or more sequences complementary to such a nucleotide sequence, and a sequence having a known catalytic region responsible for mRNA cleavage (see e.g., U.S. Pat. No. 5,093,246 or Haselhoff and Gerlach, *Nature* 334: 585-591 (1988)). For example, a derivative of a Tetrahymena L-19 IVS RNA is sometimes utilized in which the nucleotide sequence of the active site is complementary to the nucleotide sequence to be cleaved in a mRNA (see e.g., Cech et al. U.S. Patent No. 4,987,071; and Cech et al. U.S. Patent No. 5,116,742). Also, target mRNA sequences can be used to select a catalytic RNA having a specific ribonuclease activity from a pool of RNA molecules (see e.g., Bartel & Szostak, *Science* 261: 1411-1418 (1993)).

[0121] Osteoarthritis directed molecules include in certain embodiments nucleic acids that can form triple helix structures with a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A, or a substantially identical sequence thereof, especially one that includes a regulatory region that controls expression of a polypeptide. Gene expression can be inhibited by targeting nucleotide sequences complementary to the regulatory region of a nucleotide sequence referenced herein or a substantially identical sequence (e.g., promoter and/or enhancers) to form triple helical structures that prevent transcription of a gene in target cells (see e.g., Helene, *Anticancer Drug Des.* 6(6): 569-84 (1991); Helene et al., *Ann. N.Y. Acad. Sci.* 660: 27-36 (1992); and Maher, *Bioassays* 14(12): 807-15 (1992). Potential sequences that can be targeted for triple helix formation can be increased by creating a so-called "switchback" nucleic acid molecule. Switchback molecules are synthesized in an alternating 5'-3', 3'-5' manner, such that they base pair with first one strand of a duplex and then the other, eliminating the necessity for a sizeable stretch of either purines or pyrimidines to be present on one strand of a duplex.

[0122] Osteoarthritis directed molecules include RNAi and siRNA nucleic acids. Gene expression may be inhibited by the introduction of double-stranded RNA (dsRNA), which induces potent and specific gene silencing, a phenomenon called RNA interference or RNAi. See, e.g., Fire et al., US Patent Number 6,506,559; Tuschl et al. PCT International Publication No. WO 01/75164; Kay et al. PCT International Publication No. WO 03/010180A1; or Boshier JM, Labouesse, *Nat Cell Biol* 2000

Feb;2(2):E31-6. This process has been improved by decreasing the size of the double-stranded RNA to 20-24 base pairs (to create small-interfering RNAs or siRNAs) that “switched off” genes in mammalian cells without initiating an acute phase response, i.e., a host defense mechanism that often results in cell death (see, *e.g.*, Caplen et al. Proc Natl Acad Sci U S A. 2001 Aug 14;98(17):9742-7 and Elbashir et al. Methods 2002 Feb;26(2):199-213). There is increasing evidence of post-transcriptional gene silencing by RNA interference (RNAi) for inhibiting targeted expression in mammalian cells at the mRNA level, in human cells. There is additional evidence of effective methods for inhibiting the proliferation and migration of tumor cells in human patients, and for inhibiting metastatic cancer development (see, *e.g.*, U.S. Patent Application No. US2001000993183; Caplen et al. Proc Natl Acad Sci U S A; and Abderrahmani et al. Mol Cell Biol 2001 Nov21(21):7256-67).

[0123] An “siRNA” or “RNAi” refers to a nucleic acid that forms a double stranded RNA and has the ability to reduce or inhibit expression of a gene or target gene when the siRNA is delivered to or expressed in the same cell as the gene or target gene. “siRNA” refers to short double-stranded RNA formed by the complementary strands. Complementary portions of the siRNA that hybridize to form the double stranded molecule often have substantial or complete identity to the target molecule sequence. In one embodiment, an siRNA refers to a nucleic acid that has substantial or complete identity to a target gene and forms a double stranded siRNA.

[0124] When designing the siRNA molecules, the targeted region often is selected from a given DNA sequence beginning 50 to 100 nucleotides downstream of the start codon. See, *e.g.*, Elbashir et al., Methods 26:199-213 (2002). Initially, 5’ or 3’ UTRs and regions nearby the start codon were avoided assuming that UTR-binding proteins and/or translation initiation complexes may interfere with binding of the siRNP or RISC endonuclease complex. Sometimes regions of the target 23 nucleotides in length conforming to the sequence motif AA(N19)TT (N, an nucleotide), and regions with approximately 30% to 70% G/C-content (often about 50% G/C-content) often are selected. If no suitable sequences are found, the search often is extended using the motif NA(N21). The sequence of the sense siRNA sometimes corresponds to (N19) TT or N21 (position 3 to 23 of the 23-nt motif), respectively. In the latter case, the 3’ end of the sense siRNA often is converted to TT. The rationale for this sequence conversion is to generate a symmetric duplex with respect to the sequence composition of the sense and antisense 3’ overhangs. The antisense siRNA is synthesized as the complement to position 1 to 21 of the 23-nt motif. Because position 1 of the 23-nt motif is not recognized sequence-specifically by the antisense siRNA, the 3’-most nucleotide residue of the antisense siRNA can be chosen deliberately. However, the penultimate nucleotide of the antisense siRNA (complementary to position 2 of the 23-nt motif) often is complementary to the targeted sequence. For simplifying chemical synthesis, TT often is utilized. siRNAs corresponding to the target motif NAR(N17)YNN, where R is purine (A,G) and Y is pyrimidine (C,U), often are selected. Respective 21 nucleotide sense and antisense siRNAs often begin with a purine nucleotide and can also be expressed from pol III expression vectors without a change in targeting site. Expression of RNAs from pol III promoters often is efficient when the first transcribed nucleotide is a purine.

[0125] The sequence of the siRNA can correspond to the full length target gene, or a subsequence thereof. Often, the siRNA is about 15 to about 50 nucleotides in length (*e.g.*, each complementary sequence of the double stranded siRNA is 15-50 nucleotides in length, and the double stranded siRNA is about 15-50 base pairs in length, sometimes about 20-30 nucleotides in length or about 20-25 nucleotides in length, *e.g.*, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, or 30 nucleotides in length. The siRNA sometimes is about 21 nucleotides in length. Methods of using siRNA are well known in the art, and specific siRNA molecules may be purchased from a number of companies including Dharmacon Research, Inc.

[0126] Antisense, ribozyme, RNAi and siRNA nucleic acids can be altered to form modified nucleic acid molecules. The nucleic acids can be altered at base moieties, sugar moieties or phosphate backbone moieties to improve stability, hybridization, or solubility of the molecule. For example, the deoxyribose phosphate backbone of nucleic acid molecules can be modified to generate peptide nucleic acids (see Hyrup et al., *Bioorganic & Medicinal Chemistry* 4 (1): 5-23 (1996)). As used herein, the terms “peptide nucleic acid” or “PNA” refers to a nucleic acid mimic such as a DNA mimic, in which the deoxyribose phosphate backbone is replaced by a pseudopeptide backbone and only the four natural nucleobases are retained. The neutral backbone of a PNA can allow for specific hybridization to DNA and RNA under conditions of low ionic strength. Synthesis of PNA oligomers can be performed using standard solid phase peptide synthesis protocols as described, for example, in Hyrup et al., (1996) *supra* and Perry-O’Keefe et al., *Proc. Natl. Acad. Sci.* 93: 14670-675 (1996).

[0127] PNA nucleic acids can be used in prognostic, diagnostic, and therapeutic applications. For example, PNAs can be used as antisense or antigene agents for sequence-specific modulation of gene expression by, for example, inducing transcription or translation arrest or inhibiting replication. PNA nucleic acid molecules can also be used in the analysis of single base pair mutations in a gene, (*e.g.*, by PNA-directed PCR clamping); as “artificial restriction enzymes” when used in combination with other enzymes, (*e.g.*, S1 nucleases (Hyrup (1996) *supra*)); or as probes or primers for DNA sequencing or hybridization (Hyrup et al., (1996) *supra*; Perry-O’Keefe *supra*).

[0128] In other embodiments, oligonucleotides may include other appended groups such as peptides (*e.g.*, for targeting host cell receptors *in vivo*), or agents facilitating transport across cell membranes (see *e.g.*, Letsinger et al., *Proc. Natl. Acad. Sci. USA* 86: 6553-6556 (1989); Lemaitre et al., *Proc. Natl. Acad. Sci. USA* 84: 648-652 (1987); PCT Publication No. W088/09810) or the blood-brain barrier (see, *e.g.*, PCT Publication No. W089/10134). In addition, oligonucleotides can be modified with hybridization-triggered cleavage agents (See, *e.g.*, Krol et al., *Bio-Techniques* 6: 958-976 (1988)) or intercalating agents. (See, *e.g.*, Zon, *Pharm. Res.* 5: 539-549 (1988)). To this end, the oligonucleotide may be conjugated to another molecule, (*e.g.*, a peptide, hybridization triggered cross-linking agent, transport agent, or hybridization-triggered cleavage agent).

[0129] Also included herein are molecular beacon oligonucleotide primer and probe molecules having one or more regions complementary to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A, or a substantially

identical sequence thereof, two complementary regions one having a fluorophore and one a quencher such that the molecular beacon is useful for quantifying the presence of the nucleic acid in a sample. Molecular beacon nucleic acids are described, for example, in Lizardi et al., U.S. Patent No. 5,854,033; Nazarenko et al., U.S. Patent No. 5,866,336, and Livak et al., U.S. Patent 5,876,930.

Antibodies

[0130] The term “antibody” as used herein refers to an immunoglobulin molecule or immunologically active portion thereof, i.e., an antigen-binding portion. Examples of immunologically active portions of immunoglobulin molecules include F(ab) and F(ab')₂ fragments which can be generated by treating the antibody with an enzyme such as pepsin. An antibody sometimes is a polyclonal, monoclonal, recombinant (*e.g.*, a chimeric or humanized), fully human, non-human (*e.g.*, murine), or a single chain antibody. An antibody may have effector function and can fix complement, and is sometimes coupled to a toxin or imaging agent.

[0131] A full-length polypeptide or antigenic peptide fragment encoded by a nucleotide sequence referenced herein can be used as an immunogen or can be used to identify antibodies made with other immunogens, *e.g.*, cells, membrane preparations, and the like. An antigenic peptide often includes at least 8 amino acid residues of the amino acid sequences encoded by a nucleotide sequence referenced herein, or substantially identical sequence thereof, and encompasses an epitope. Antigenic peptides sometimes include 10 or more amino acids, 15 or more amino acids, 20 or more amino acids, or 30 or more amino acids. Hydrophilic and hydrophobic fragments of polypeptides sometimes are used as immunogens.

[0132] Epitopes encompassed by the antigenic peptide are regions located on the surface of the polypeptide (*e.g.*, hydrophilic regions) as well as regions with high antigenicity. For example, an Emini surface probability analysis of the human polypeptide sequence can be used to indicate the regions that have a particularly high probability of being localized to the surface of the polypeptide and are thus likely to constitute surface residues useful for targeting antibody production. The antibody may bind an epitope on any domain or region on polypeptides described herein.

[0133] Also, chimeric, humanized, and completely human antibodies are useful for applications which include repeated administration to subjects. Chimeric and humanized monoclonal antibodies, comprising both human and non-human portions, can be made using standard recombinant DNA techniques. Such chimeric and humanized monoclonal antibodies can be produced by recombinant DNA techniques known in the art, for example using methods described in Robinson et al International Application No. PCT/US86/02269; Akira, et al European Patent Application 184,187; Taniguchi, M., European Patent Application 171,496; Morrison et al European Patent Application 173,494; Neuberger et al PCT International Publication No. WO 86/01533; Cabilly et al U.S. Patent No. 4,816,567; Cabilly et al European Patent Application 125,023; Better et al., Science 240: 1041-1043 (1988); Liu et al., Proc. Natl. Acad. Sci. USA 84: 3439-3443 (1987); Liu et al., J. Immunol. 139: 3521-3526 (1987); Sun et al., Proc. Natl. Acad. Sci. USA 84: 214-218 (1987); Nishimura et al., Canc. Res. 47: 999-1005

(1987); Wood et al., Nature 314: 446-449 (1985); and Shaw et al., J. Natl. Cancer Inst. 80: 1553-1559 (1988); Morrison, S. L., Science 229: 1202-1207 (1985); Oi et al., BioTechniques 4: 214 (1986); Winter U.S. Patent 5,225,539; Jones et al., Nature 321: 552-525 (1986); Verhoeyan et al., Science 239: 1534; and Beidler et al., J. Immunol. 141: 4053-4060 (1988).

[0134] Completely human antibodies are particularly desirable for therapeutic treatment of human patients. Such antibodies can be produced using transgenic mice that are incapable of expressing endogenous immunoglobulin heavy and light chains genes, but which can express human heavy and light chain genes. See, for example, Lonberg and Huszar, Int. Rev. Immunol. 13: 65-93 (1995); and U.S. Patent Nos. 5,625,126; 5,633,425; 5,569,825; 5,661,016; and 5,545,806. In addition, companies such as Abgenix, Inc. (Fremont, CA) and Medarex, Inc. (Princeton, NJ), can be engaged to provide human antibodies directed against a selected antigen using technology similar to that described above. Completely human antibodies that recognize a selected epitope also can be generated using a technique referred to as "guided selection." In this approach a selected non-human monoclonal antibody (*e.g.*, a murine antibody) is used to guide the selection of a completely human antibody recognizing the same epitope. This technology is described for example by Jespers et al., Bio/Technology 12: 899-903 (1994).

[0135] An antibody can be a single chain antibody. A single chain antibody (scFV) can be engineered (see, *e.g.*, Colcher et al., Ann. N Y Acad. Sci. 880: 263-80 (1999); and Reiter, Clin. Cancer Res. 2: 245-52 (1996)). Single chain antibodies can be dimerized or multimerized to generate multivalent antibodies having specificities for different epitopes of the same target polypeptide.

[0136] Antibodies also may be selected or modified so that they exhibit reduced or no ability to bind an Fc receptor. For example, an antibody may be an isotype or subtype, fragment or other mutant, which does not support binding to an Fc receptor (*e.g.*, it has a mutagenized or deleted Fc receptor binding region).

[0137] Also, an antibody (or fragment thereof) may be conjugated to a therapeutic moiety such as a cytotoxin, a therapeutic agent or a radioactive metal ion. A cytotoxin or cytotoxic agent includes any agent that is detrimental to cells. Examples include taxol, cytochalasin B, gramicidin D, ethidium bromide, emetine, mitomycin, etoposide, tenoposide, vincristine, vinblastine, colchicin, doxorubicin, daunorubicin, dihydroxy anthracin dione, mitoxantrone, mithramycin, actinomycin D, 1 dehydrotestosterone, glucocorticoids, procaine, tetracaine, lidocaine, propranolol, and puromycin and analogs or homologs thereof. Therapeutic agents include, but are not limited to, antimetabolites (*e.g.*, methotrexate, 6-mercaptopurine, 6-thioguanine, cytarabine, 5-fluorouracil decarbazine), alkylating agents (*e.g.*, mechlorethamine, thiotepa chlorambucil, melphalan, carmustine (BCNU) and lomustine (CCNU), cyclophosphamide, busulfan, dibromomannitol, streptozotocin, mitomycin C, and cis-dichlorodiamine platinum (II) (DDP) cisplatin), anthracyclines (*e.g.*, daunorubicin (formerly daunomycin) and doxorubicin), antibiotics (*e.g.*, dactinomycin (formerly actinomycin), bleomycin, mithramycin, and anthramycin (AMC)), and anti-mitotic agents (*e.g.*, vincristine and vinblastine).

[0138] Antibody conjugates can be used for modifying a given biological response. For example, the drug moiety may be a protein or polypeptide possessing a desired biological activity. Such proteins may include, for example, a toxin such as abrin, ricin A, pseudomonas exotoxin, or diphtheria toxin; a polypeptide such as tumor necrosis factor, gamma-interferon, alpha-interferon, nerve growth factor, platelet derived growth factor, tissue plasminogen activator; or, biological response modifiers such as, for example, lymphokines, interleukin-1 ("IL-1"), interleukin-2 ("IL-2"), interleukin-6 ("IL-6"), granulocyte macrophage colony stimulating factor ("GM-CSF"), granulocyte colony stimulating factor ("G-CSF"), or other growth factors. Also, an antibody can be conjugated to a second antibody to form an antibody heteroconjugate as described by Segal in U.S. Patent No. 4,676,980, for example.

[0139] An antibody (*e.g.*, monoclonal antibody) can be used to isolate target polypeptides by standard techniques, such as affinity chromatography or immunoprecipitation. Moreover, an antibody can be used to detect a target polypeptide (*e.g.*, in a cellular lysate or cell supernatant) in order to evaluate the abundance and pattern of expression of the polypeptide. Antibodies can be used diagnostically to monitor polypeptide levels in tissue as part of a clinical testing procedure, *e.g.*, to determine the efficacy of a given treatment regimen. Detection can be facilitated by coupling (*i.e.*, physically linking) the antibody to a detectable substance (*i.e.*, antibody labeling). Examples of detectable substances include various enzymes, prosthetic groups, fluorescent materials, luminescent materials, bioluminescent materials, and radioactive materials. Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, β -galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin, and examples of suitable radioactive material include ^{125}I , ^{131}I , ^{35}S or ^3H . Also, an antibody can be utilized as a test molecule for determining whether it can treat osteoarthritis, and as a therapeutic for administration to a subject for treating osteoarthritis.

[0140] An antibody can be made by immunizing with a purified antigen, or a fragment thereof, *e.g.*, a fragment described herein, a membrane associated antigen, tissues, *e.g.*, crude tissue preparations, whole cells, preferably living cells, lysed cells, or cell fractions.

[0141] Included herein are antibodies which bind only a native polypeptide, only denatured or otherwise non-native polypeptide, or which bind both, as well as those having linear or conformational epitopes. Conformational epitopes sometimes can be identified by selecting antibodies that bind to native but not denatured polypeptide. Also featured are antibodies that specifically bind to a polypeptide variant associated with osteoarthritis.

Methods for Identifying Candidate Therapeutics for Treating Osteoarthritis

[0142] Current therapies for the treatment of osteoarthritis have limited efficacy, limited tolerability and significant mechanism-based side effects, and few of the available therapies adequately

address underlying defects. Current therapeutic approaches were largely developed in the absence of defined molecular targets or even a solid understanding of disease pathogenesis. Therefore, provided are methods of identifying candidate therapeutics that target biochemical pathways related to the development of osteoarthritis.

[0143] Thus, featured herein are methods for identifying a candidate therapeutic for treating osteoarthritis. The methods comprise contacting a test molecule with a target molecule in a system. A “target molecule” as used herein refers to a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleotide sequence referenced in Table A, a substantially identical nucleic acid thereof, or a fragment thereof, and an encoded polypeptide of the foregoing. The methods also comprise determining the presence or absence of an interaction between the test molecule and the target molecule, where the presence of an interaction between the test molecule and the nucleic acid or polypeptide identifies the test molecule as a candidate osteoarthritis therapeutic. The interaction between the test molecule and the target molecule may be quantified.

[0144] Test molecules and candidate therapeutics include, but are not limited to, compounds, antisense nucleic acids, siRNA molecules, ribozymes, polypeptides or proteins encoded by a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleotide sequence or other nucleotide sequence referenced in Table A, or a substantially identical sequence or fragment thereof, and immunotherapeutics (e.g., antibodies and HLA-presented polypeptide fragments). A test molecule or candidate therapeutic may act as a modulator of target molecule concentration or target molecule function in a system. A “modulator” may agonize (i.e., up-regulates) or antagonize (i.e., down-regulates) a target molecule concentration partially or completely in a system by affecting such cellular functions as DNA replication and/or DNA processing (e.g., DNA methylation or DNA repair), RNA transcription and/or RNA processing (e.g., removal of intronic sequences and/or translocation of spliced mRNA from the nucleus), polypeptide production (e.g., translation of the polypeptide from mRNA), and/or polypeptide post-translational modification (e.g., glycosylation, phosphorylation, and proteolysis of pro-polypeptides). A modulator may also agonize or antagonize a biological function of a target molecule partially or completely, where the function may include adopting a certain structural conformation, interacting with one or more binding partners, ligand binding, catalysis (e.g., phosphorylation, dephosphorylation, hydrolysis, methylation, and isomerization), and an effect upon a cellular event (e.g., effecting progression of osteoarthritis).

[0145] As used herein, the term “system” refers to a cell free *in vitro* environment and a cell-based environment such as a collection of cells, a tissue, an organ, or an organism. A system is “contacted” with a test molecule in a variety of manners, including adding molecules in solution and allowing them to interact with one another by diffusion, cell injection, and any administration routes in an animal. As used herein, the term “interaction” refers to an effect of a test molecule on test molecule, where the effect sometimes is binding between the test molecule and the target molecule, and sometimes is an observable change in cells, tissue, or organism.

[0146] There are many standard methods for detecting the presence or absence of interaction between a test molecule and a target molecule. For example, titrametric, acidimetric, radiometric, NMR, monolayer, polarographic, spectrophotometric, fluorescent, and ESR assays probative of a target molecule interaction may be utilized. Any modulator can be tested in such methods and modulators for certain targets described in Table A are known. For example, modulators of protein tyrosine phosphatases (*e.g.*, *PTPNI* includes a protein phosphatase domain) are described in WO-03072537, WO-03020688, WO-00218321, WO-00218323, WO-03055883, WO-03041729, WO-00226707, WO-00226743 and WO-03037328; modulators of potassium channels (*e.g.*, *KCNS1* includes a potassium channel domain) are described in WO-09962891, WO-09716437, WO-09521813, WO-09521823, WO-09521824, WO-09521825 and WO-03088908; modulators of annexin (*e.g.*, *ANXA6* includes an annexin domain) are described in WO-2004018670, WO-02067857, WO-2004013303 and WO-00147510; proteasome modulators (*e.g.*, *PSMB1* includes a proteasome domain) are described in WO-2004014882 and Roesel et al. Proceedings of the American Association of Cancer Research 2003, 44:1st Ed (Abs 1769), and bortezomib (Velcade, MLN-341, LDP-341 and PS-341), a ubiquitin proteasome inhibitor, is used for the treatment of multiple myeloma; and modulators of protein kinases (*e.g.*, *FYN* is a protein kinase) are described in WO-03081210, WO-02080926, WO-02076986, WO-03077921, WO03026666, WO03026665 and WO03026664.

[0147] Test molecule/target molecule interactions can be detected and/or quantified using assays known in the art. For example, an interaction can be determined by labeling the test molecule and/or the target molecule, where the label is covalently or non-covalently attached to the test molecule or target molecule. The label is sometimes a radioactive molecule such as ^{125}I , ^{131}I , ^{35}S or ^3H , which can be detected by direct counting of radioemission or by scintillation counting. Also, enzymatic labels such as horseradish peroxidase, alkaline phosphatase, or luciferase may be utilized where the enzymatic label can be detected by determining conversion of an appropriate substrate to product. In addition, presence or absence of an interaction can be determined without labeling. For example, a microphysiometer (*e.g.*, Cytosensor) is an analytical instrument that measures the rate at which a cell acidifies its environment using a light-addressable potentiometric sensor (LAPS). Changes in this acidification rate can be used as an indication of an interaction between a test molecule and target molecule (McConnell, H. M. *et al.*, *Science* 257: 1906-1912 (1992)).

[0148] In cell-based systems, cells typically include a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleotide sequence referenced in Table A, an encoded polypeptide, or substantially identical nucleic acid or polypeptide thereof, and are often of mammalian origin, although the cell can be of any origin. Whole cells, cell homogenates, and cell fractions (*e.g.*, cell membrane fractions) can be subjected to analysis. Where interactions between a test molecule with a target polypeptide are monitored, soluble and/or membrane bound forms of the polypeptide may be utilized. Where membrane-bound forms of the polypeptide are used, it may be desirable to utilize a solubilizing agent. Examples of such solubilizing agents include non-ionic detergents such as n-octylglucoside, n-dodecylglucoside, n-dodecylmaltoside, octanoyl-N-methylglucamide, decanoyl-N-

methylglucamide, Triton[®] X-100, Triton[®] X-114, Thesit[®], Isotridecypoly(ethylene glycol ether)_n, 3-[(3-cholamidopropyl)dimethylamminio]-1-propane sulfonate (CHAPS), 3-[(3-cholamidopropyl)dimethylamminio]-2-hydroxy-1-propane sulfonate (CHAPSO), or N-dodecyl-N,N-dimethyl-3-ammonio-1-propane sulfonate.

[0149] An interaction between a test molecule and target molecule also can be detected by monitoring fluorescence energy transfer (FET) (*see, e.g.*, Lakowicz *et al.*, U.S. Patent No. 5,631,169; Stavrianopoulos *et al.* U.S. Patent No. 4,868,103). A fluorophore label on a first, “donor” molecule is selected such that its emitted fluorescent energy will be absorbed by a fluorescent label on a second, “acceptor” molecule, which in turn is able to fluoresce due to the absorbed energy. Alternately, the “donor” polypeptide molecule may simply utilize the natural fluorescent energy of tryptophan residues. Labels are chosen that emit different wavelengths of light, such that the “acceptor” molecule label may be differentiated from that of the “donor”. Since the efficiency of energy transfer between the labels is related to the distance separating the molecules, the spatial relationship between the molecules can be assessed. In a situation in which binding occurs between the molecules, the fluorescent emission of the “acceptor” molecule label in the assay should be maximal. An FET binding event can be conveniently measured through standard fluorometric detection means well known in the art (*e.g.*, using a fluorimeter).

[0150] In another embodiment, determining the presence or absence of an interaction between a test molecule and a target molecule can be effected by monitoring surface plasmon resonance (*see, e.g.*, Sjolander & Urbanicz, *Anal. Chem.* 63: 2338-2345 (1991) and Szabo *et al.*, *Curr. Opin. Struct. Biol.* 5: 699-705 (1995)). “Surface plasmon resonance” or “biomolecular interaction analysis (BIA)” can be utilized to detect biospecific interactions in real time, without labeling any of the interactants (*e.g.*, BIAcore). Changes in the mass at the binding surface (indicative of a binding event) result in alterations of the refractive index of light near the surface (the optical phenomenon of surface plasmon resonance (SPR)), resulting in a detectable signal which can be used as an indication of real-time reactions between biological molecules.

[0151] In another embodiment, the target molecule or test molecules are anchored to a solid phase, facilitating the detection of target molecule/test molecule complexes and separation of the complexes from free, uncomplexed molecules. The target molecule or test molecule is immobilized to the solid support. In an embodiment, the target molecule is anchored to a solid surface, and the test molecule, which is not anchored, can be labeled, either directly or indirectly, with detectable labels discussed herein.

[0152] It may be desirable to immobilize a target molecule, an anti-target molecule antibody, and/or test molecules to facilitate separation of target molecule/test molecule complexes from uncomplexed forms, as well as to accommodate automation of the assay. The attachment between a test molecule and/or target molecule and the solid support may be covalent or non-covalent (*see, e.g.*, U.S. Patent No. 6,022,688 for non-covalent attachments). The solid support may be one or more surfaces of

the system, such as one or more surfaces in each well of a microtiter plate, a surface of a silicon wafer, a surface of a bead (*see, e.g.*, Lam, *Nature* 354: 82-84 (1991)) that is optionally linked to another solid support, or a channel in a microfluidic device, for example. Types of solid supports, linker molecules for covalent and non-covalent attachments to solid supports, and methods for immobilizing nucleic acids and other molecules to solid supports are well known (*see, e.g.*, U.S. Patent Nos. 6,261,776; 5,900,481; 6,133,436; and 6,022,688; and WIPO publication WO 01/18234).

[0153] In an embodiment, target molecule may be immobilized to surfaces via biotin and streptavidin. For example, biotinylated target polypeptide can be prepared from biotin-NHS (N-hydroxy-succinimide) using techniques known in the art (*e.g.*, biotinylation kit, Pierce Chemicals, Rockford, IL), and immobilized in the wells of streptavidin-coated 96 well plates (Pierce Chemical). In another embodiment, a target polypeptide can be prepared as a fusion polypeptide. For example, glutathione-S-transferase/target polypeptide fusion can be adsorbed onto glutathione sepharose beads (Sigma Chemical, St. Louis, MO) or glutathione derivitized microtiter plates, which are then combined with a test molecule under conditions conducive to complex formation (*e.g.*, at physiological conditions for salt and pH). Following incubation, the beads or microtiter plate wells are washed to remove any unbound components, or the matrix is immobilized in the case of beads, and complex formation is determined directly or indirectly as described above. Alternatively, the complexes can be dissociated from the matrix, and the level of target molecule binding or activity is determined using standard techniques.

[0154] In an embodiment, the non-immobilized component is added to the coated surface containing the anchored component. After the reaction is complete, unreacted components are removed (*e.g.*, by washing) under conditions such that a significant percentage of complexes formed will remain immobilized to the solid surface. The detection of complexes anchored on the solid surface can be accomplished in a number of manners. Where the previously non-immobilized component is pre-labeled, the detection of label immobilized on the surface indicates that complexes were formed. Where the previously non-immobilized component is not pre-labeled, an indirect label can be used to detect complexes anchored on the surface, *e.g.*, by adding a labeled antibody specific for the immobilized component, where the antibody, in turn, can be directly labeled or indirectly labeled with, *e.g.*, a labeled anti-Ig antibody.

[0155] In another embodiment, an assay is performed utilizing antibodies that specifically bind target molecule or test molecule but do not interfere with binding of the target molecule to the test molecule. Such antibodies can be derivitized to a solid support, and unbound target molecule may be immobilized by antibody conjugation. Methods for detecting such complexes, in addition to those described above for the GST-immobilized complexes, include immunodetection of complexes using antibodies reactive with the target molecule, as well as enzyme-linked assays which rely on detecting an enzymatic activity associated with the target molecule.

[0156] Cell free assays also can be conducted in a liquid phase. In such an assay, reaction products are separated from unreacted components, by any of a number of standard techniques, including but not

limited to: differential centrifugation (*see, e.g.,* Rivas, G., and Minton, *Trends Biochem Sci Aug; 18(8): 284-7 (1993)*); chromatography (gel filtration chromatography, ion-exchange chromatography); electrophoresis (*see, e.g.,* Ausubel *et al., eds. Current Protocols in Molecular Biology, J. Wiley: New York (1999)*); and immunoprecipitation (*see, e.g.,* Ausubel *et al., eds., supra*). Media and chromatographic techniques are known to one skilled in the art (*see, e.g.,* Heegaard, *J Mol. Recognit. Winter; 11(1-6): 141-8 (1998)*; Hage & Tweed, *J. Chromatogr. B Biomed. Sci. Appl. Oct 10; 699 (1-2): 499-525 (1997)*). Further, fluorescence energy transfer may also be conveniently utilized, as described herein, to detect binding without further purification of the complex from solution.

[0157] In another embodiment, modulators of target molecule expression are identified. For example, a cell or cell free mixture is contacted with a candidate compound and the expression of target mRNA or target polypeptide is evaluated relative to the level of expression of target mRNA or target polypeptide in the absence of the candidate compound. When expression of target mRNA or target polypeptide is greater in the presence of the candidate compound than in its absence, the candidate compound is identified as an agonist of target mRNA or target polypeptide expression. Alternatively, when expression of target mRNA or target polypeptide is less (*e.g.,* less with statistical significance) in the presence of the candidate compound than in its absence, the candidate compound is identified as an antagonist or inhibitor of target mRNA or target polypeptide expression. The level of target mRNA or target polypeptide expression can be determined by methods described herein.

[0158] In another embodiment, binding partners that interact with a target molecule are detected. The target molecules can interact with one or more cellular or extracellular macromolecules, such as polypeptides *in vivo*, and these interacting molecules are referred to herein as “binding partners.” Binding partners can agonize or antagonize target molecule biological activity. Also, test molecules that agonize or antagonize interactions between target molecules and binding partners can be useful as therapeutic molecules as they can up-regulate or down-regulated target molecule activity *in vivo* and thereby treat osteoarthritis.

[0159] Binding partners of target molecules can be identified by methods known in the art. For example, binding partners may be identified by lysing cells and analyzing cell lysates by electrophoretic techniques. Alternatively, a two-hybrid assay or three-hybrid assay can be utilized (*see, e.g.,* U.S. Patent No. 5,283,317; Zervos *et al., Cell 72:223-232 (1993)*; Madura *et al., J. Biol. Chem. 268: 12046-12054 (1993)*; Bartel *et al., Biotechniques 14: 920-924 (1993)*; Iwabuchi *et al., Oncogene 8: 1693-1696 (1993)*; and Brent WO94/10300). A two-hybrid system is based on the modular nature of most transcription factors, which consist of separable DNA-binding and activation domains. The assay often utilizes two different DNA constructs. In one construct, a *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A (sometimes referred to as the “bait”) is fused to a gene encoding the DNA binding domain of a known transcription factor (*e.g.,* GAL-4). In another construct, a DNA sequence from a library of DNA sequences that encodes a potential binding partner (sometimes referred to as the “prey”) is fused to a gene that encodes an activation domain of the known transcription factor. Sometimes, a *KIAA0296*, *Chrom 4*, *Chrom 6*,

ELP3, *LRCH1*, *SNW1* or *ERG* nucleic acid or other nucleic acid referenced in Table A can be fused to the activation domain. If the “bait” and the “prey” molecules interact *in vivo*, the DNA-binding and activation domains of the transcription factor are brought into close proximity. This proximity allows transcription of a reporter gene (*e.g.*, LacZ) which is operably linked to a transcriptional regulatory site responsive to the transcription factor. Expression of the reporter gene can be detected and cell colonies containing the functional transcription factor can be isolated and used to identify the potential binding partner.

[0160] In an embodiment for identifying test molecules that antagonize or agonize complex formation between target molecules and binding partners, a reaction mixture containing the target molecule and the binding partner is prepared, under conditions and for a time sufficient to allow complex formation. The reaction mixture often is provided in the presence or absence of the test molecule. The test molecule can be included initially in the reaction mixture, or can be added at a time subsequent to the addition of the target molecule and its binding partner. Control reaction mixtures are incubated without the test molecule or with a placebo. Formation of any complexes between the target molecule and the binding partner then is detected. Decreased formation of a complex in the reaction mixture containing test molecule as compared to in a control reaction mixture indicates that the molecule antagonizes target molecule/binding partner complex formation. Alternatively, increased formation of a complex in the reaction mixture containing test molecule as compared to in a control reaction mixture indicates that the molecule agonizes target molecule/binding partner complex formation. In another embodiment, complex formation of target molecule/binding partner can be compared to complex formation of mutant target molecule/binding partner (*e.g.*, amino acid modifications in a target polypeptide). Such a comparison can be important in those cases where it is desirable to identify test molecules that modulate interactions of mutant but not non-mutated target gene products.

[0161] The assays can be conducted in a heterogeneous or homogeneous format. In heterogeneous assays, target molecule and/or the binding partner are immobilized to a solid phase, and complexes are detected on the solid phase at the end of the reaction. In homogeneous assays, the entire reaction is carried out in a liquid phase. In either approach, the order of addition of reactants can be varied to obtain different information about the molecules being tested. For example, test compounds that agonize target molecule/binding partner interactions can be identified by conducting the reaction in the presence of the test molecule in a competition format. Alternatively, test molecules that agonize preformed complexes, *e.g.*, molecules with higher binding constants that displace one of the components from the complex, can be tested by adding the test compound to the reaction mixture after complexes have been formed.

[0162] In a heterogeneous assay embodiment, the target molecule or the binding partner is anchored onto a solid surface (*e.g.*, a microtiter plate), while the non-anchored species is labeled, either directly or indirectly. The anchored molecule can be immobilized by non-covalent or covalent attachments. Alternatively, an immobilized antibody specific for the molecule to be anchored can be

used to anchor the molecule to the solid surface. The partner of the immobilized species is exposed to the coated surface with or without the test molecule. After the reaction is complete, unreacted components are removed (*e.g.*, by washing) such that a significant portion of any complexes formed will remain immobilized on the solid surface. Where the non-immobilized species is pre-labeled, the detection of label immobilized on the surface is indicative of complex. Where the non-immobilized species is not pre-labeled, an indirect label can be used to detect complexes anchored to the surface; *e.g.*, by using a labeled antibody specific for the initially non-immobilized species. Depending upon the order of addition of reaction components, test compounds that inhibit complex formation or that disrupt preformed complexes can be detected.

[0163] In another embodiment, the reaction can be conducted in a liquid phase in the presence or absence of test molecule, where the reaction products are separated from unreacted components, and the complexes are detected (*e.g.*, using an immobilized antibody specific for one of the binding components to anchor any complexes formed in solution, and a labeled antibody specific for the other partner to detect anchored complexes). Again, depending upon the order of addition of reactants to the liquid phase, test compounds that inhibit complex or that disrupt preformed complexes can be identified.

[0164] In an alternate embodiment, a homogeneous assay can be utilized. For example, a preformed complex of the target gene product and the interactive cellular or extracellular binding partner product is prepared. One or both of the target molecule or binding partner is labeled, and the signal generated by the label(s) is quenched upon complex formation (*e.g.*, U.S. Patent No. 4,109,496 that utilizes this approach for immunoassays). Addition of a test molecule that competes with and displaces one of the species from the preformed complex will result in the generation of a signal above background. In this way, test substances that disrupt target molecule/binding partner complexes can be identified.

[0165] Candidate therapeutics for treating osteoarthritis are identified from a group of test molecules that interact with a target molecule. Test molecules are normally ranked according to the degree with which they modulate (*e.g.*, agonize or antagonize) a function associated with the target molecule (*e.g.*, DNA replication and/or processing, RNA transcription and/or processing, polypeptide production and/or processing, and/or biological function/activity), and then top ranking modulators are selected. Also, pharmacogenomic information described herein can determine the rank of a modulator. The top 10% of ranked test molecules often are selected for further testing as candidate therapeutics, and sometimes the top 15%, 20%, or 25% of ranked test molecules are selected for further testing as candidate therapeutics. Candidate therapeutics typically are formulated for administration to a subject.

Therapeutic Formulations

[0166] Formulations and pharmaceutical compositions typically include in combination with a pharmaceutically acceptable carrier one or more target molecule modulators. The modulator often is a test molecule identified as having an interaction with a target molecule by a screening method described above. The modulator may be a compound, an antisense nucleic acid, a ribozyme, an antibody, or a

binding partner. Also, formulations may comprise a target polypeptide or fragment thereof in combination with a pharmaceutically acceptable carrier.

[0167] As used herein, the term “pharmaceutically acceptable carrier” includes solvents, dispersion media, coatings, antibacterial and antifungal agents, isotonic and absorption delaying agents, and the like, compatible with pharmaceutical administration. Supplementary active compounds can also be incorporated into the compositions. Pharmaceutical compositions can be included in a container, pack, or dispenser together with instructions for administration.

[0168] A pharmaceutical composition typically is formulated to be compatible with its intended route of administration. Examples of routes of administration include parenteral, *e.g.*, intravenous, intradermal, subcutaneous, oral (*e.g.*, inhalation), transdermal (topical), transmucosal, and rectal administration. Solutions or suspensions used for parenteral, intradermal, or subcutaneous application can include the following components: a sterile diluent such as water for injection, saline solution, fixed oils, polyethylene glycols, glycerin, propylene glycol or other synthetic solvents; antibacterial agents such as benzyl alcohol or methyl parabens; antioxidants such as ascorbic acid or sodium bisulfite; chelating agents such as ethylenediaminetetraacetic acid; buffers such as acetates, citrates or phosphates and agents for the adjustment of tonicity such as sodium chloride or dextrose. pH can be adjusted with acids or bases, such as hydrochloric acid or sodium hydroxide. The parenteral preparation can be enclosed in ampoules, disposable syringes or multiple dose vials made of glass or plastic.

[0169] Oral compositions generally include an inert diluent or an edible carrier. For the purpose of oral therapeutic administration, the active compound can be incorporated with excipients and used in the form of tablets, troches, or capsules, *e.g.*, gelatin capsules. Oral compositions can also be prepared using a fluid carrier for use as a mouthwash. Pharmaceutically compatible binding agents, and/or adjuvant materials can be included as part of the composition. The tablets, pills, capsules, troches and the like can contain any of the following ingredients, or compounds of a similar nature: a binder such as microcrystalline cellulose, gum tragacanth or gelatin; an excipient such as starch or lactose, a disintegrating agent such as alginic acid, Primogel, or corn starch; a lubricant such as magnesium stearate or Sterotes; a glidant such as colloidal silicon dioxide; a sweetening agent such as sucrose or saccharin; or a flavoring agent such as peppermint, methyl salicylate, or orange flavoring.

[0170] Pharmaceutical compositions suitable for injectable use include sterile aqueous solutions (where water soluble) or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersion. For intravenous administration, suitable carriers include physiological saline, bacteriostatic water, Cremophor EL™ (BASF, Parsippany, NJ) or phosphate buffered saline (PBS). In all cases, the composition must be sterile and should be fluid to the extent that easy syringability exists. It should be stable under the conditions of manufacture and storage and must be preserved against the contaminating action of microorganisms such as bacteria and fungi. The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (for example, glycerol, propylene glycol, and liquid polyethylene glycol, and the like), and suitable mixtures thereof. The proper fluidity can be maintained, for example, by the use of a coating such as lecithin, by

the maintenance of the required particle size in the case of dispersion and by the use of surfactants. Prevention of the action of microorganisms can be achieved by various antibacterial and antifungal agents, for example, parabens, chlorobutanol, phenol, ascorbic acid, thimerosal, and the like. In many cases, it will be preferable to include isotonic agents, for example, sugars, polyalcohols such as mannitol, sorbitol, sodium chloride in the composition. Prolonged absorption of the injectable compositions can be brought about by including in the composition an agent which delays absorption, for example, aluminum monostearate and gelatin.

[0171] Sterile injectable solutions can be prepared by incorporating the active compound in the required amount in an appropriate solvent with one or a combination of ingredients enumerated above, as required, followed by filtered sterilization. Generally, dispersions are prepared by incorporating the active compound into a sterile vehicle which contains a basic dispersion medium and the required other ingredients from those enumerated above. In the case of sterile powders for the preparation of sterile injectable solutions, the preferred methods of preparation are vacuum drying and freeze-drying which yields a powder of the active ingredient plus any additional desired ingredient from a previously sterile-filtered solution thereof.

[0172] For administration by inhalation, the compounds are delivered in the form of an aerosol spray from pressured container or dispenser which contains a suitable propellant, *e.g.*, a gas such as carbon dioxide, or a nebulizer.

[0173] Systemic administration can also be by transmucosal or transdermal means. For transmucosal or transdermal administration, penetrants appropriate to the barrier to be permeated are used in the formulation. Such penetrants are generally known in the art, and include, for example, for transmucosal administration, detergents, bile salts, and fusidic acid derivatives. Transmucosal administration can be accomplished through the use of nasal sprays or suppositories. For transdermal administration, the active compounds are formulated into ointments, salves, gels, or creams as generally known in the art. Molecules can also be prepared in the form of suppositories (*e.g.*, with conventional suppository bases such as cocoa butter and other glycerides) or retention enemas for rectal delivery.

[0174] In one embodiment, active molecules are prepared with carriers that will protect the compound against rapid elimination from the body, such as a controlled release formulation, including implants and microencapsulated delivery systems. Biodegradable, biocompatible polymers can be used, such as ethylene vinyl acetate, polyanhydrides, polyglycolic acid, collagen, polyorthoesters, and polylactic acid. Methods for preparation of such formulations will be apparent to those skilled in the art. Materials can also be obtained commercially from Alza Corporation and Nova Pharmaceuticals, Inc. Liposomal suspensions (including liposomes targeted to infected cells with monoclonal antibodies to viral antigens) can also be used as pharmaceutically acceptable carriers. These can be prepared according to methods known to those skilled in the art, for example, as described in U.S. Patent No. 4,522,811.

[0175] It is advantageous to formulate oral or parenteral compositions in dosage unit form for ease of administration and uniformity of dosage. Dosage unit form as used herein refers to physically

discrete units suited as unitary dosages for the subject to be treated; each unit containing a predetermined quantity of active compound calculated to produce the desired therapeutic effect in association with the required pharmaceutical carrier.

[0176] Toxicity and therapeutic efficacy of such compounds can be determined by standard pharmaceutical procedures in cell cultures or experimental animals, *e.g.*, for determining the LD₅₀ (the dose lethal to 50% of the population) and the ED₅₀ (the dose therapeutically effective in 50% of the population). The dose ratio between toxic and therapeutic effects is the therapeutic index and it can be expressed as the ratio LD₅₀/ED₅₀. Molecules which exhibit high therapeutic indices are preferred. While molecules that exhibit toxic side effects may be used, care should be taken to design a delivery system that targets such compounds to the site of affected tissue in order to minimize potential damage to uninfected cells and, thereby, reduce side effects.

[0177] The data obtained from the cell culture assays and animal studies can be used in formulating a range of dosage for use in humans. The dosage of such molecules lies preferably within a range of circulating concentrations that include the ED₅₀ with little or no toxicity. The dosage may vary within this range depending upon the dosage form employed and the route of administration utilized. For any molecules used in the methods described herein, the therapeutically effective dose can be estimated initially from cell culture assays. A dose may be formulated in animal models to achieve a circulating plasma concentration range that includes the IC₅₀ (*i.e.*, the concentration of the test compound which achieves a half-maximal inhibition of symptoms) as determined in cell culture. Such information can be used to more accurately determine useful doses in humans. Levels in plasma may be measured, for example, by high performance liquid chromatography.

[0178] As defined herein, a therapeutically effective amount of protein or polypeptide (*i.e.*, an effective dosage) ranges from about 0.001 to 30 mg/kg body weight, sometimes about 0.01 to 25 mg/kg body weight, often about 0.1 to 20 mg/kg body weight, and more often about 1 to 10 mg/kg, 2 to 9 mg/kg, 3 to 8 mg/kg, 4 to 7 mg/kg, or 5 to 6 mg/kg body weight. The protein or polypeptide can be administered one time per week for between about 1 to 10 weeks, sometimes between 2 to 8 weeks, often between about 3 to 7 weeks, and more often for about 4, 5, or 6 weeks. The skilled artisan will appreciate that certain factors may influence the dosage and timing required to effectively treat a subject, including but not limited to the severity of the disease or disorder, previous treatments, the general health and/or age of the subject, and other diseases present. Moreover, treatment of a subject with a therapeutically effective amount of a protein, polypeptide, or antibody can include a single treatment or, preferably, can include a series of treatments.

[0179] With regard to polypeptide formulations, featured herein is a method for treating osteoarthritis in a subject, which comprises contacting one or more cells in the subject with a first polypeptide, where the subject comprises a second polypeptide having one or more polymorphic variations associated with cancer, and where the first polypeptide comprises fewer polymorphic variations associated with cancer than the second polypeptide. The first and second polypeptides are encoded by a nucleic acid which comprises a nucleotide sequence in SEQ ID NO: 1-7 or referenced in

Table A; a nucleotide sequence which encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence referenced in SEQ ID NO: 1-7 or referenced in Table A; a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO: 1-7 or referenced in Table A and a nucleotide sequence 90% or more identical to a nucleotide sequence in SEQ ID NO: 1-7 or referenced in Table A. The subject often is a human.

[0180] For antibodies, a dosage of 0.1 mg/kg of body weight (generally 10 mg/kg to 20 mg/kg) is often utilized. If the antibody is to act in the brain, a dosage of 50 mg/kg to 100 mg/kg is often appropriate. Generally, partially human antibodies and fully human antibodies have a longer half-life within the human body than other antibodies. Accordingly, lower dosages and less frequent administration is often possible. Modifications such as lipidation can be used to stabilize antibodies and to enhance uptake and tissue penetration (*e.g.*, into the brain). A method for lipidation of antibodies is described by Cruikshank *et al.*, *J. Acquired Immune Deficiency Syndromes and Human Retrovirology* 14:193 (1997).

[0181] Antibody conjugates can be used for modifying a given biological response, the drug moiety is not to be construed as limited to classical chemical therapeutic agents. For example, the drug moiety may be a protein or polypeptide possessing a desired biological activity. Such proteins may include, for example, a toxin such as abrin, ricin A, pseudomonas exotoxin, or diphtheria toxin; a polypeptide such as tumor necrosis factor, alpha-interferon, beta-interferon, nerve growth factor, platelet derived growth factor, tissue plasminogen activator; or, biological response modifiers such as, for example, lymphokines, interleukin-1 ("IL-1"), interleukin-2 ("IL-2"), interleukin-6 ("IL-6"), granulocyte macrophage colony stimulating factor ("GM-CSF"), granulocyte colony stimulating factor ("G-CSF"), or other growth factors. Alternatively, an antibody can be conjugated to a second antibody to form an antibody heteroconjugate as described by Segal in U.S. Patent No. 4,676,980.

[0182] For compounds, exemplary doses include milligram or microgram amounts of the compound per kilogram of subject or sample weight, for example, about 1 microgram per kilogram to about 500 milligrams per kilogram, about 100 micrograms per kilogram to about 5 milligrams per kilogram, or about 1 microgram per kilogram to about 50 micrograms per kilogram. It is understood that appropriate doses of a small molecule depend upon the potency of the small molecule with respect to the expression or activity to be modulated. When one or more of these small molecules is to be administered to an animal (*e.g.*, a human) in order to modulate expression or activity of a polypeptide or nucleic acid described herein, a physician, veterinarian, or researcher may, for example, prescribe a relatively low dose at first, subsequently increasing the dose until an appropriate response is obtained. In addition, it is understood that the specific dose level for any particular animal subject will depend upon a variety of factors including the activity of the specific compound employed, the age, body weight, general health, gender, and diet of the subject, the time of administration, the route of administration, the rate of excretion, any drug combination, and the degree of expression or activity to be modulated.

[0183] With regard to nucleic acid formulations, gene therapy vectors can be delivered to a subject by, for example, intravenous injection, local administration (*see, e.g.*, U.S. Patent 5,328,470) or by stereotactic injection (*see e.g.*, Chen *et al.*, (1994) *Proc. Natl. Acad. Sci. USA* 91:3054-3057). Pharmaceutical preparations of gene therapy vectors can include a gene therapy vector in an acceptable diluent, or can comprise a slow release matrix in which the gene delivery vehicle is imbedded. Alternatively, where the complete gene delivery vector can be produced intact from recombinant cells (*e.g.*, retroviral vectors) the pharmaceutical preparation can include one or more cells which produce the gene delivery system. Examples of gene delivery vectors are described herein.

Therapeutic Methods

[0184] A therapeutic formulation described above can be administered to a subject in need of a therapeutic for inducing a desired biological response. Therapeutic formulations can be administered by any of the paths described herein. With regard to both prophylactic and therapeutic methods of treatment, such treatments may be specifically tailored or modified, based on knowledge obtained from pharmacogenomic analyses described herein.

[0185] As used herein, the term "treatment" is defined as the application or administration of a therapeutic formulation to a subject, or application or administration of a therapeutic agent to an isolated tissue or cell line from a subject with the purpose to cure, heal, alleviate, relieve, alter, remedy, ameliorate, improve or affect osteoarthritis, symptoms of osteoarthritis or a predisposition towards osteoarthritis. A therapeutic formulation includes, but is not limited to, small molecules, peptides, antibodies, ribozymes and antisense oligonucleotides. Administration of a therapeutic formulation can occur prior to the manifestation of symptoms characteristic of osteoarthritis, such that osteoarthritis is prevented or delayed in its progression. The appropriate therapeutic composition can be determined based on screening assays described herein.

[0186] As discussed, successful treatment of osteoarthritis can be brought about by techniques that serve to agonize target molecule expression or function, or alternatively, antagonize target molecule expression or function. These techniques include administration of modulators that include, but are not limited to, small organic or inorganic molecules; antibodies (including, for example, polyclonal, monoclonal, humanized, anti-idiotypic, chimeric or single chain antibodies, and Fab, F(ab')₂ and Fab expression library fragments, scFV molecules, and epitope-binding fragments thereof); and peptides, phosphopeptides, or polypeptides.

[0187] Further, antisense and ribozyme molecules that inhibit expression of the target gene can also be used to reduce the level of target gene expression, thus effectively reducing the level of target gene activity. Still further, triple helix molecules can be utilized in reducing the level of target gene activity. Antisense, ribozyme and triple helix molecules are discussed above. It is possible that the use of antisense, ribozyme, and/or triple helix molecules to reduce or inhibit mutant gene expression can also reduce or inhibit the transcription (triple helix) and/or translation (antisense, ribozyme) of mRNA produced by normal target gene alleles, such that the concentration of normal target gene product

present can be lower than is necessary for a normal phenotype. In such cases, nucleic acid molecules that encode and express target gene polypeptides exhibiting normal target gene activity can be introduced into cells via gene therapy method. Alternatively, in instances in that the target gene encodes an extracellular polypeptide, it can be preferable to co-administer normal target gene polypeptide into the cell or tissue in order to maintain the requisite level of cellular or tissue target gene activity.

[0188] Another method by which nucleic acid molecules may be utilized in treating or preventing osteoarthritis is use of aptamer molecules specific for target molecules. Aptamers are nucleic acid molecules having a tertiary structure which permits them to specifically bind to ligands (*see, e.g.,* Osborne, *et al., Curr. Opin. Chem. Biol.* 1(1): 5-9 (1997); and Patel, D. J., *Curr. Opin. Chem. Biol. Jun; 1(1): 32-46 (1997)*).

[0189] Yet another method of utilizing nucleic acid molecules for osteoarthritis treatment is gene therapy, which can also be referred to as allele therapy. Provided herein is a gene therapy method for treating osteoarthritis in a subject, which comprises contacting one or more cells in the subject or from the subject with a nucleic acid having a first nucleotide sequence (*e.g.,* the first nucleotide sequence is identical to or substantially identical to a nucleotide sequence of SEQ ID NO: 1-7 or other nucleotide sequence referenced in Table A). Genomic DNA in the subject comprises a second nucleotide sequence having one or more polymorphic variations associated with osteoarthritis (*e.g.,* the second nucleotide sequence is identical to or substantially identical to a nucleotide sequence of SEQ ID NO: 1-7 or other nucleotide sequence referenced in Table A). The first and second nucleotide sequences typically are substantially identical to one another, and the first nucleotide sequence comprises fewer polymorphic variations associated with osteoarthritis than the second nucleotide sequence. The first nucleotide sequence may comprise a gene sequence that encodes a full-length polypeptide or a fragment thereof. The subject is often a human. Allele therapy methods often are utilized in conjunction with a method of first determining whether a subject has genomic DNA that includes polymorphic variants associated with osteoarthritis.

[0190] In another allele therapy embodiment, provided herein is a method which comprises contacting one or more cells in the subject or from the subject with a polypeptide encoded by a nucleic acid having a first nucleotide sequence (*e.g.,* the first nucleotide sequence is identical to or substantially identical to the nucleotide sequence of SEQ ID NO: 1-7 or other nucleotide sequence referenced in Table A). Genomic DNA in the subject comprises a second nucleotide sequence having one or more polymorphic variations associated with osteoarthritis (*e.g.,* the second nucleotide sequence is identical to or substantially identical to a nucleotide sequence of SEQ ID NO: 1-7 or other nucleotide sequence referenced in Table A). The first and second nucleotide sequences typically are substantially identical to one another, and the first nucleotide sequence comprises fewer polymorphic variations associated with osteoarthritis than the second nucleotide sequence. The first nucleotide sequence may comprise a gene sequence that encodes a full-length polypeptide or a fragment thereof. The subject is often a human.

[0191] For antibody-based therapies, antibodies can be generated that are both specific for target molecules and that reduce target molecule activity. Such antibodies may be administered in instances where antagonizing a target molecule function is appropriate for the treatment of osteoarthritis.

[0192] In circumstances where stimulating antibody production in an animal or a human subject by injection with a target molecule is harmful to the subject, it is possible to generate an immune response against the target molecule by use of anti-idiotypic antibodies (*see, e.g., Herlyn, Ann. Med.; 31(1): 66-78 (1999); and Bhattacharya-Chatterjee & Foon, Cancer Treat. Res.; 94: 51-68 (1998)*). Introducing an anti-idiotypic antibody to a mammal or human subject often stimulates production of anti-anti-idiotypic antibodies, which typically are specific to the target molecule. Vaccines directed to osteoarthritis also may be generated in this fashion.

[0193] In instances where the target molecule is intracellular and whole antibodies are used, internalizing antibodies may be preferred. Lipofectin or liposomes can be used to deliver the antibody or a fragment of the Fab region that binds to the target antigen into cells. Where fragments of the antibody are used, the smallest inhibitory fragment that binds to the target antigen is preferred. For example, peptides having an amino acid sequence corresponding to the Fv region of the antibody can be used. Alternatively, single chain neutralizing antibodies that bind to intracellular target antigens can also be administered. Such single chain antibodies can be administered, for example, by expressing nucleotide sequences encoding single-chain antibodies within the target cell population (*see, e.g., Marasco et al., Proc. Natl. Acad. Sci. USA 90: 7889-7893 (1993)*).

[0194] Modulators can be administered to a patient at therapeutically effective doses to treat osteoarthritis. A therapeutically effective dose refers to an amount of the modulator sufficient to result in amelioration of symptoms of osteoarthritis. Toxicity and therapeutic efficacy of modulators can be determined by standard pharmaceutical procedures in cell cultures or experimental animals, *e.g., for determining the LD₅₀ (the dose lethal to 50% of the population) and the ED₅₀ (the dose therapeutically effective in 50% of the population)*. The dose ratio between toxic and therapeutic effects is the therapeutic index and it can be expressed as the ratio LD₅₀/ED₅₀. Modulators that exhibit large therapeutic indices are preferred. While modulators that exhibit toxic side effects can be used, care should be taken to design a delivery system that targets such molecules to the site of affected tissue in order to minimize potential damage to uninfected cells, thereby reducing side effects.

[0195] Data obtained from cell culture assays and animal studies can be used in formulating a range of dosages for use in humans. The dosage of such compounds lies preferably within a range of circulating concentrations that include the ED₅₀ with little or no toxicity. The dosage can vary within this range depending upon the dosage form employed and the route of administration utilized. For any compound used in the methods described herein, the therapeutically effective dose can be estimated initially from cell culture assays. A dose can be formulated in animal models to achieve a circulating plasma concentration range that includes the IC₅₀ (*i.e., the concentration of the test compound that achieves a half-maximal inhibition of symptoms*) as determined in cell culture. Such information can be

used to more accurately determine useful doses in humans. Levels in plasma can be measured, for example, by high performance liquid chromatography.

[0196] Another example of effective dose determination for an individual is the ability to directly assay levels of “free” and “bound” compound in the serum of the test subject. Such assays may utilize antibody mimics and/or “biosensors” that have been created through molecular imprinting techniques. Molecules that modulate target molecule activity are used as a template, or “imprinting molecule”, to spatially organize polymerizable monomers prior to their polymerization with catalytic reagents. The subsequent removal of the imprinted molecule leaves a polymer matrix which contains a repeated “negative image” of the compound and is able to selectively rebind the molecule under biological assay conditions. A detailed review of this technique can be seen in Ansell *et al.*, *Current Opinion in Biotechnology* 7: 89-94 (1996) and in Shea, *Trends in Polymer Science* 2: 166-173 (1994). Such “imprinted” affinity matrixes are amenable to ligand-binding assays, whereby the immobilized monoclonal antibody component is replaced by an appropriately imprinted matrix. An example of the use of such matrixes in this way can be seen in Vlatakis, *et al.*, *Nature* 361: 645-647 (1993). Through the use of isotope-labeling, the “free” concentration of compound which modulates target molecule expression or activity readily can be monitored and used in calculations of IC_{50} . Such “imprinted” affinity matrixes can also be designed to include fluorescent groups whose photon-emitting properties measurably change upon local and selective binding of target compound. These changes readily can be assayed in real time using appropriate fiberoptic devices, in turn allowing the dose in a test subject to be quickly optimized based on its individual IC_{50} . An example of such a “biosensor” is discussed in Kriz *et al.*, *Analytical Chemistry* 67: 2142-2144 (1995).

[0197] The examples set forth below illustrate but not limit the invention.

Examples

[0198] In the following studies a group of subjects was selected according to specific parameters pertaining to osteoarthritis. Nucleic acid samples obtained from individuals in the study group were subjected to genetic analyses that identified associations between osteoarthritis and certain polymorphic variants in human genomic DNA. The polymorphisms were genotyped again in two replication cohorts consisting of individuals selected for OA. In addition, SNPs proximal to the incident polymorphism in the *KIAA0296* region, the *Chrom 4* region, the *Chrom 6* region, the *ELP3* region, the *LRCH1* region, the *SNW1* region and in the *ERG* region were identified and allelotyped in OA case and control pools. Methods are described for producing target polypeptides encoded by the nucleic acids of Table A *in vitro* or *in vivo*, which can be utilized in methods that screen test molecules for those that interact with target polypeptides. Test molecules identified as being interactors with target polypeptides can be screened further as osteoarthritis therapeutics.

Example 1
Samples and Pooling Strategies

Sample Selection

[0199] Blood samples were collected from individuals diagnosed with knee osteoarthritis, which were referred to as case samples. Also, blood samples were collected from individuals not diagnosed with knee osteoarthritis as gender and age-matched controls. A database was created that listed all phenotypic trait information gathered from individuals for each case and control sample. Genomic DNA was extracted from each of the blood samples for genetic analyses.

DNA Extraction from Blood Samples

[0200] Six to ten milliliters of whole blood was transferred to a 50 ml tube containing 27 ml of red cell lysis solution (RCL). The tube was inverted until the contents were mixed. Each tube was incubated for 10 minutes at room temperature and inverted once during the incubation. The tubes were then centrifuged for 20 minutes at 3000 x g and the supernatant was carefully poured off. 100-200 µl of residual liquid was left in the tube and was pipetted repeatedly to resuspend the pellet in the residual supernatant. White cell lysis solution (WCL) was added to the tube and pipetted repeatedly until completely mixed. While no incubation was normally required, the solution was incubated at 37°C or room temperature if cell clumps were visible after mixing until the solution was homogeneous. 2 ml of protein precipitation was added to the cell lysate. The mixtures were vortexed vigorously at high speed for 20 sec to mix the protein precipitation solution uniformly with the cell lysate, and then centrifuged for 10 minutes at 3000 x g. The supernatant containing the DNA was then poured into a clean 15 ml tube, which contained 7 ml of 100% isopropanol. The samples were mixed by inverting the tubes gently until white threads of DNA were visible. Samples were centrifuged for 3 minutes at 2000 x g and the DNA was visible as a small white pellet. The supernatant was decanted and 5 ml of 70% ethanol was added to each tube. Each tube was inverted several times to wash the DNA pellet, and then centrifuged for 1 minute at 2000 x g. The ethanol was decanted and each tube was drained on clean absorbent paper. The DNA was dried in the tube by inversion for 10 minutes, and then 1000 µl of 1X TE was added. The size of each sample was estimated, and less TE buffer was added during the following DNA hydration step if the sample was smaller. The DNA was allowed to rehydrate overnight at room temperature, and DNA samples were stored at 2-8°C.

[0201] DNA was quantified by placing samples on a hematology mixer for at least 1 hour. DNA was serially diluted (typically 1:80, 1:160, 1:320, and 1:640 dilutions) so that it would be within the measurable range of standards. 125 µl of diluted DNA was transferred to a clear U-bottom microtitre plate, and 125 µl of 1X TE buffer was transferred into each well using a multichannel pipette. The DNA and 1X TE were mixed by repeated pipetting at least 15 times, and then the plates were sealed. 50 µl of diluted DNA was added to wells A5-H12 of a black flat bottom microtitre plate. Standards were

inverted six times to mix them, and then 50 µl of 1X TE buffer was pipetted into well A1, 1000 ng/ml of standard was pipetted into well A2, 500 ng/ml of standard was pipetted into well A3, and 250 ng/ml of standard was pipetted into well A4. PicoGreen (Molecular Probes, Eugene, Oregon) was thawed and freshly diluted 1:200 according to the number of plates that were being measured. PicoGreen was vortexed and then 50µl was pipetted into all wells of the black plate with the diluted DNA. DNA and PicoGreen were mixed by pipetting repeatedly at least 10 times with the multichannel pipette. The plate was placed into a Fluoroskan Ascent Machine (microplate fluorometer produced by Labsystems) and the samples were allowed to incubate for 3 minutes before the machine was run using filter pairs 485 nm excitation and 538 nm emission wavelengths. Samples having measured DNA concentrations of greater than 450 ng/µl were re-measured for conformation. Samples having measured DNA concentrations of 20 ng/µl or less were re-measured for confirmation.

Pooling Strategies – Discovery Cohort

[0202] Samples were derived from the Nottingham knee OA family study (UK) where index cases were identified through a knee replacement registry. Siblings were approached and assessed with knee x-rays and assigned status as affected or unaffected. In all 1,157 individuals were available. In order to create same-sex pools of appropriate sizes, 335 unrelated female individuals with OA from the Nottingham OA sample were selected for the case pool. The control pool was made up of unrelated female individuals from the St. Thomas twin study (England) with normal knee x-rays and without other indications of OA, regardless of anatomical location, as well as lacking family history of OA. The St. Thomas twin study consists of Caucasian, female participants from the St. Thomas' Hospital, London, adult-twin registry, which is a voluntary registry of >4,000 twin pairs ranging from 18 to 76 years of age. The female case samples and female control samples are described further in Table 1 below.

[0203] A select set of samples from each group were utilized to generate pools, and one pool was created for each group. Each individual sample in a pool was represented by an equal amount of genomic DNA. For example, where 25 ng of genomic DNA was utilized in each PCR reaction and there were 200 individuals in each pool, each individual would provide 125 pg of genomic DNA. Inclusion or exclusion of samples for a pool was based upon the following criteria: the sample was derived from an individual characterized as Caucasian; the sample was derived from an individual of British paternal and maternal descent; case samples were derived from individuals diagnosed with specific knee osteoarthritis (OA) and were recruited from an OA knee replacement clinic. Control samples were derived from individuals free of OA, family history of OA, and rheumatoid arthritis. Also, sufficient genomic DNA was extracted from each blood sample for all allelotyping and genotyping reactions performed during the study. Phenotype information from each individual was collected and included age of the individual, gender, family history of OA, general medical information (*e.g.*, height, weight, thyroid disease, diabetes, psoriasis, hysterectomy), joint history (previous and current symptoms, joint-related operations, age at onset of symptoms, date of primary diagnosis, age of

individual as of primary diagnosis and order of involvement), and knee-related findings (crepitus, restricted passive movement, bony swelling/deformity). Additional knee information included knee history, current symptoms, any major knee injury, meniscectomy, knee replacement surgery, age of surgery, and treatment history (including hormone replace therapy (HRT)). Samples that met these criteria were added to appropriate pools based on disease status.

[0204] The selection process yielded the pools set forth in Table 1, which were used in the studies that follow:

TABLE 1

	Female case	Female control
Pool size (Number)	335	335
Pool Criteria (ex: case/control)	control	case
Mean Age (ex: years)	57.21	69.95

Example 2

Association of Polymorphic Variants with Osteoarthritis

[0205] A whole-genome screen was performed to identify particular SNPs associated with occurrence of osteoarthritis. As described in Example 1, two sets of samples were utilized, which included samples from female individuals having knee osteoarthritis (osteoarthritis cases), and samples from female individuals not having knee osteoarthritis (female controls). The initial screen of each pool was performed in an allelotyping study, in which certain samples in each group were pooled. By pooling DNA from each group, an allele frequency for each SNP in each group was calculated. These allele frequencies were then compared to one another. Particular SNPs were considered as being associated with osteoarthritis when allele frequency differences calculated between case and control pools were statistically significant. SNP disease association results obtained from the allelotyping study were then validated by genotyping each associated SNP across all samples from each pool. The results of the genotyping then were analyzed, allele frequencies for each group were calculated from the individual genotyping results, and a p-value was calculated to determine whether the case and control groups had statistically significant differences in allele frequencies for a particular SNP. When the genotyping results agreed with the original allelotyping results, the SNP disease association was considered validated at the genetic level.

SNP Panel Used for Genetic Analyses

[0206] A whole-genome SNP screen began with an initial screen of approximately 25,000 SNPs over each set of disease and control samples using a pooling approach. The pools studied in the screen are described in Example 1. The SNPs analyzed in this study were part of a set of 25,488 SNPs

confirmed as being statistically polymorphic as each is characterized as having a minor allele frequency of greater than 10%. The SNPs in the set reside in genes or in close proximity to genes, and many reside in gene exons. Specifically, SNPs in the set are located in exons, introns, and within 5,000 base-pairs upstream of a transcription start site of a gene. In addition, SNPs were selected according to the following criteria: they are located in ESTs; they are located in Locuslink or Ensembl genes; and they are located in Genomatix promoter predictions. SNPs in the set were also selected on the basis of even spacing across the genome, as depicted in Table 2.

[0207] A case-control study design using a whole genome association strategy involving approximately 28,000 single nucleotide polymorphisms (SNPs) was employed. Approximately 25,000 SNPs were evenly spaced in gene-based regions of the human genome with a median inter-marker distance of about 40,000 base pairs. Additionally, approximately 3,000 SNPs causing amino acid substitutions in genes described in the literature as candidates for various diseases were used. The case-control study samples were of female Caucasian origin (British paternal and maternal descent) 670 individuals were equally distributed in two groups: female controls and female cases. The whole genome association approach was first conducted on 2 DNA pools representing the 2 groups. Significant markers were confirmed by individual genotyping.

TABLE 2

<u>General Statistics</u>		<u>Spacing Statistics</u>	
Total # of SNPs	25,488	Median	37,058 bp
# of Exonic SNPs	>4,335 (17%)	Minimum*	1,000 bp
# SNPs with refSNP ID	20,776 (81%)	Maximum*	3,000,000 bp
Gene Coverage	>10,000	Mean	122,412 bp
Chromosome Coverage	All	Std Deviation	373,325 bp
		<i>*Excludes outliers</i>	

Allelotyping and Genotyping Results

[0208] The genetic studies summarized above and described in more detail below identified allelic variants associated with osteoarthritis, which are summarized in Table A.

Assay for Verifying, Allelotyping, and Genotyping SNPs

[0209] A MassARRAY™ system (Sequenom, Inc.) was utilized to perform SNP genotyping in a high-throughput fashion. This genotyping platform was complemented by a homogeneous, single-tube assay method (hME™ or homogeneous MassEXTEND™ (Sequenom, Inc.)) in which two genotyping primers anneal to and amplify a genomic target surrounding a polymorphic site of interest. A third primer (the MassEXTEND™ primer), which is complementary to the amplified target up to but not including the polymorphism, was then enzymatically extended one or a few bases through the polymorphic site and then terminated.

[0210] For each polymorphism, SpectroDESIGNER™ software (Sequenom, Inc.) was used to generate a set of PCR primers and a MassEXTEND™ primer which were used to genotype the polymorphism. Other primer design software could be used or one of ordinary skill in the art could manually design primers based on his or her knowledge of the relevant factors and considerations in designing such primers. Table 3 shows PCR primers and Table 4 shows extension primers used for analyzing polymorphisms. The initial PCR amplification reaction was performed in a 5 µl total volume containing 1X PCR buffer with 1.5 mM MgCl₂ (Qiagen), 200 µM each of dATP, dGTP, dCTP, dTTP (Gibco-BRL), 2.5 ng of genomic DNA, 0.1 units of HotStar DNA polymerase (Qiagen), and 200 nM each of forward and reverse PCR primers specific for the polymorphic region of interest.

TABLE 3: PCR Primers

SNP Reference	Forward PCR primer	Reverse PCR primer
rs552	ACGTTGGATGGACTGAGGTAGATGATGC	ACGTTGGATGGCTTTCTTTCCCTTGGTTTC
rs12904	ACGTTGGATGGAACCACTCCCACCACAG	ACGTTGGATGGGTGGGGATGGCACTGTC
rs2282146	ACGTTGGATGTCCCACGAGGACCTGGAG	ACGTTGGATGTTTCGTTTGGGTGGCCGGG
rs734784	ACGTTGGATGTCTGGGATGTCTCCAGAGATG	ACGTTGGATGGCAACCACCAAGAGTTTGAG
rs1042164	ACGTTGGATGTTTCTTCCAGACGGGCTTTC	ACGTTGGATGCAAAGTCAGCCGCAAACGAC
rs749670	ACGTTGGATGTCTCATCTGTGTGCCATTG	ACGTTGGATGATGAGGGTGAAAGGCAGGAG
rs955592	ACGTTGGATGTTCCCATTTCTTCTTGGGCTC	ACGTTGGATGTCTCAGAGGGTCTCCTTTTC
rs1143016	ACGTTGGATGTTGTCCAGCAGGTAGGGCAG	ACGTTGGATGACCCATCGCGGATACATGTG
rs755248	ACGTTGGATGGGTCTCTGCTGAGGAAGTGG	ACGTTGGATGACACTCACTACGGGGCCAG
rs1055055	ACGTTGGATGTTGTGCTTGTCTGAGGAATCC	ACGTTGGATGGTTGCAGAGAGCGTCTATAC
rs835409	ACGTTGGATGTCCTGTTGGCTTTTGCAGAC	ACGTTGGATGACTGCTCATGGTGGTTGAAC
rs927663	ACGTTGGATGTTTGACTGGTTGCCCAAAC	ACGTTGGATGAAGAATCTTCAGTGCCAGCC
rs8162	ACGTTGGATGCTTCATCCAGAACCTCCAGG	ACGTTGGATGTGCATATGGCTTGTGAGAGC
rs831038	ACGTTGGATGTGAAAGAGCTGCCTTCTTTC	ACGTTGGATGAAATGACACTCACGGTAAGC
rs33079	ACGTTGGATGTTATTTTATTGGCCAAGCCC	ACGTTGGATGGTGTTCACCTTGTTCATGCAC
rs1710880	ACGTTGGATGCGAAGGCAGAGAATAAACTG	ACGTTGGATGAACTCTGTGGTTTAAGAAAG
rs1078153	ACGTTGGATGTCCTGCGTGTAACTGAGAGG	ACGTTGGATGAACATACACACAGTGCGAGC
rs799570	ACGTTGGATGATGCATATGGGCAGGTTGCC	ACGTTGGATGCCAGGAAAGCATCCTCAGAC
rs1282730	ACGTTGGATGTCCTTTGACTTACTGTGCTG	ACGTTGGATGAGAAAAGAGGTTGTGTACAG
rs1518875	ACGTTGGATGAGAATGCGTTCAATGCCTGC	ACGTTGGATGAGCGAAAAGCTCTGCCATTG
rs1568694	ACGTTGGATGGTTCATTTCAGTTATGGACGG	ACGTTGGATGTGATAGGAGGGAGCCATCTC
rs905042	ACGTTGGATGTAACAATGGTAAGGGCCAAG	ACGTTGGATGGGTCCATAATGGTCATTGTG
rs1957723	ACGTTGGATGTACTCACTTGTGTACTGCTC	ACGTTGGATGGCTGCAGCGTCACATTAATC
rs794018	ACGTTGGATGGGATGATGATGAAATGACTG	ACGTTGGATGGCTCTAGTTAGATGAGTCTC
rs707723	ACGTTGGATGTGTGGCTGAAGTTTGCTCTG	ACGTTGGATGCACACACAAACCTTGAAGAG
rs893861	ACGTTGGATGGAGGCATGTACACAAAACCTG	ACGTTGGATGGCTCACGACTGTAATAGTTG
rs1914903	ACGTTGGATGTGCGTCAAGTTGAAGTCCTC	ACGTTGGATGAGGGTAGTGAGTTCACATGC
rs2062232	ACGTTGGATGTCCTGCTCAGATAACTGCTG	ACGTTGGATGGCGGTAGTTTTCCCTAAACC
rs26609	ACGTTGGATGCAAGGGAGATCAGAAACATC	ACGTTGGATGAATTCATTGTTCTTGATGGC
rs1370987	ACGTTGGATGATACTTTGGATGTCTGGTGG	ACGTTGGATGGGTCTTTGGTCACAACTATC
rs1012414	ACGTTGGATGACTTGGAAAGTCAGTCTGGG	ACGTTGGATGGAAACCGAGAAATGGCTATG
rs435903	ACGTTGGATGGGCATAAGTTAGAGACAACC	ACGTTGGATGGGCTATGTTATGCTGCTGTG
rs1248	ACGTTGGATGGAGATTGTGCATTTTGGCAAG	ACGTTGGATGCAGACACCATCTTAACCAAG
rs703508	ACGTTGGATGAGCTCTGTGGCCTCTTTTGG	ACGTTGGATGTACTCACAGTCTTCCCGGCG
rs226465	ACGTTGGATGAATTTTGACCCCTGCCAACC	ACGTTGGATGTATGTGAAAGAGGCGTGAAG
rs241448	ACGTTGGATGCAAGCTGCAGAAGCTTGCC	ACGTTGGATGTGAGAAGAGGGCCCAAGTATC
rs763155	ACGTTGGATGGGGAAACCCAAAATAGTGTC	ACGTTGGATGTCACAGGAGAGTAATGCCTC
rs1040461	ACGTTGGATGACATCTGGTGGAAAGTCACTC	ACGTTGGATGGGTCTTTGTTTGTGGGTC
rs462832	ACGTTGGATGCACTTTCTCTGTAATATTG	ACGTTGGATGTGAGACAACAAAATTTGCC

SNP Reference	Forward PCR primer	Reverse PCR primer
rs804194	ACGTTGGATGTAATCCGGTGGCAGATCAAG	ACGTTGGATGGAAATTCATGTGCTGACGGG
rs1022646	ACGTTGGATGACTGTCACCTAATCATCCTG	ACGTTGGATGGACTATGTTGGAGTTCAGAG
rs1569112	ACGTTGGATGTCATGATCTGCCTGTGGAGA	ACGTTGGATGACCATCCTCACACCCATCCA
rs805623	ACGTTGGATGATCAACCACTCATACACTGC	ACGTTGGATGCACAGAAACAGCTGGATTGC
rs1019850	ACGTTGGATGTTTTACTCCAGGAAGCCACC	ACGTTGGATGAGCAGGGAGAATTGTTCCAG
rs1599931	ACGTTGGATGTCAAACCCTTCCTGTAGACG	ACGTTGGATGTGAACATAGTAGGCGCTCAG
AA	ACGTTGGATGTAGGAGTGCTCGTATTTTGG	ACGTTGGATGCTGGGAACAGCTTTTGATCC
rs279941	ACGTTGGATGCATAGGGAACACCGAGAATG	ACGTTGGATGGGTTGTCTATCTATGGGCTAG
rs1062230	ACGTTGGATGAAACTCCTTTCCCTCTCAAG	ACGTTGGATGGGCCCATCAGTCTATAGTTT
rs1859911	ACGTTGGATGCTGTTTTTCCGAGCATCTAC	ACGTTGGATGCCTCTTGCATATGAGATAGG
rs1477261	ACGTTGGATGCAGGGTTATGTGGTATTATC	ACGTTGGATGGGGAAAGTAAAAGATAAGAG
rs1191119	ACGTTGGATGACTCTCAGGGTGATTATCTG	ACGTTGGATGTGTAAGATTCTGGCACTGTC
rs657780	ACGTTGGATGTTTAAGAAGCCGCCAAGGAG	ACGTTGGATGCCCATTTTCAGACCACTTGG
rs1393890	ACGTTGGATGGTCTGATTATCTTTCTGCCG	ACGTTGGATGGGTACCTTTATCCTTGCTTC
rs1478714	ACGTTGGATGAATAATTTGCTGACACCCCC	ACGTTGGATGGGAGTCCAGAGGTTAAACAG
rs868213	ACGTTGGATGTGTCAGAACTGGGCACATTC	ACGTTGGATGAGGGATAGGGATCAGGAATG
rs690115	ACGTTGGATGAATAGCCAAGGCCGTGTGGG	ACGTTGGATGCACCTGGGAGATAGCAGGG
rs1465501	ACGTTGGATGTCAGGAATTGTTACCTGGAC	ACGTTGGATGCCCTCATCTAGACACTTTTG
rs899173	ACGTTGGATGAGTGCCACATCACTCTTG TG	ACGTTGGATGTTCTGCTCCACTACAGTCTC
rs10477	ACGTTGGATGGGGGCTACGTGGAAGTTACC	ACGTTGGATGATGGCAATCAAGAGAGTCTAA
rs926393	ACGTTGGATGAGATCAGCCCAGGAAATGTG	ACGTTGGATGTGTTGGAGAAGGTTTCCACC
rs465271	ACGTTGGATGAATCACAGCTCATGGCTCAC	ACGTTGGATGATGGTAGTGTGCACCTATGG
rs13847	ACGTTGGATGCGCCCGTAGTGATAAGCAC	ACGTTGGATGCAGGACAGGGCAGAGTGAG
rs738658	ACGTTGGATGGATGGTATGTGTGCATCAGG	ACGTTGGATGCTTTCCAAGAGATGGCGTTC
rs756519	ACGTTGGATGTCTAGAGACACCTGAGGTTG	ACGTTGGATGTGTTTCACTTCAGAGCCCTG
rs1042327	ACGTTGGATGAACTTCACATCACAGCTCCC	ACGTTGGATGCAGAAGTTGGGTTTTCCAGC
rs8770	ACGTTGGATGCTGTCACTGGACACTTTTG	ACGTTGGATGAAAATAGAGGTGCAGAGATG
rs1563055	ACGTTGGATGAGTTCTTTCTCCTCACATTG	ACGTTGGATGCCCTTTAGAAGCACATACTC
rs912428	ACGTTGGATGACTACATCCATTCCAGGGAG	ACGTTGGATGTCAGATCAGAGTGAGTTTAG
rs1888475	ACGTTGGATGACCCCTGGCAAGTGAATTAC	ACGTTGGATGGGGAGGTGGATGTTCTTATC

[0211] Samples were incubated at 95°C for 15 minutes, followed by 45 cycles of 95°C for 20 seconds, 56°C for 30 seconds, and 72°C for 1 minute, finishing with a 3 minute final extension at 72°C. Following amplification, shrimp alkaline phosphatase (SAP) (0.3 units in a 2 µl volume) (Amersham Pharmacia) was added to each reaction (total reaction volume was 7 µl) to remove any residual dNTPs that were not consumed in the PCR step. Samples were incubated for 20 minutes at 37°C, followed by 5 minutes at 85°C to denature the SAP.

[0212] Once the SAP reaction was complete, a primer extension reaction was initiated by adding a polymorphism-specific MassEXTEND™ primer cocktail to each sample. Each MassEXTEND™ cocktail included a specific combination of dideoxynucleotides (ddNTPs) and deoxynucleotides (dNTPs) used to distinguish polymorphic alleles from one another. Methods for verifying, allelotyping and genotyping SNPs are disclosed, for example, in U.S. Pat. No. 6,258,538, the content of which is hereby incorporated by reference. In Table 4, ddNTPs are shown and the fourth nucleotide not shown is the dNTP.

TABLE 4: Extension Primers

SNP Reference	Extend Probe	Termination Mix
rs552	TGATGCTGTTGTCAGATACC	ACT
rs12904	AGCCTCAAAACGGGTCA	ACT
rs2282146	GGACCTGGAGCCCCCACC	ACG
rs734784	GCCTCCGACACCCCATCAA	ACG
rs1042164	CTTGCTCGGGACCAGTCCA	ACT
rs749670	GGTGGTGGGCATCCCTTTC	ACG
rs955592	TTGGGCTCTGACCACCTCT	ACT
rs1143016	ATGCAGCGTCACCAGCAC	ACT
rs755248	TGAGGAAGTGGCAGGTGTG	ACG
rs1055055	CCCAGTTCAGGCTCACTTTC	ACT
rs835409	TTGCAGACCAGCCAATTAAGAA	ACT
rs927663	GGTTGCCCAAACCTCCCTT	ACT
rs8162	AACACAGAGCAAAGCACC	ACT
rs831038	CGTTATAGTAAAGGAAAGGCAG	ACG
rs33079	CCCATCACCTGGAGCTTTG	ACG
rs1710880	CTGTATTATGTTTCCCCTTGG	CGT
rs1078153	GCCGGCACCGTCAGAAAC	CGT
rs799570	GCAGTTCCTAGAAGACAGCT	ACT
rs1282730	TGCTGGCCCAACTTTTGTCT	ACG
rs1518875	CTGCAATGTTTCCAAACCCC	ACT
rs1568694	AGTTATGGACGGAAGAAGGG	ACG
rs905042	GGTAAGGGCCAAGTGAGTG	CGT
rs1957723	AGCATGGCATAGGCACTGG	ACG
rs794018	AAATGACTGAAAATGTGTACTATA	ACG
rs707723	CCTGAGGTATATTCAATA	ACG
rs893861	CATGTACACAAAACCTGTTAAGTAA	ACG
rs1914903	TCCCCATAGATGGACCTGC	ACG
rs2062232	GCTGAAGACAAGGATTAGGTT	ACG
rs26609	GAGATCAGAAACATCACCTTG	CGT
rs1370987	TTTGGGAGTTACTGCCTTAGAA	ACT
rs1012414	ACTAGGAACCAGAAATATGAGCATC	ACG
rs435903	AAGCTAACAATGGAATAATGGC	ACG
rs1248	GTGCATTTTGGCAAGAATATATG	CGT
rs703508	GGGGTCCAGGCAGAAAGAAAC	ACG
rs226465	CCTCTTCCCCTCCTCCCT	ACT
rs241448	GCAGAAGCTTGCCAGCTC	ACG
rs763155	GCAGCCTGCAAGTGAGTGA	ACT
rs1040461	AAGTCACTCCGGTCAGAATTCA	ACT
rs462832	ATAAGAATCTTTTAGATCCCAACA	CGT
rs804194	GATCAAGGCTGATCTCGCC	ACT
rs1022646	CCTAATCATCCTGCCACCC	ACT
rs1569112	ACCAGGCCGCATGGGCTG	ACG
rs805623	CTGTGTTCAAATAAGGCAACC	ACT
rs1019850	AGGAAGCCACCAGCTAATAC	CGT
rs1599931	CTGAGGCCGGGAGGGATT	ACT
AA	TAGTTTTAAATTCTGCACA	ACT
rs279941	AACACCGAGAATGAAAACATC	ACT
rs1062230	ATGCTGGTTCTGTCCAA	ACG
rs1859911	TCCGAGCATCTACATGCTCA	ACT
rs1477261	AGGAGGAGCCCAAATATGAAA	CGT
rs1191119	GTCTTTTTGTTAACTGGGGAACCC	ACG
rs657780	CGCCAAGGAGTTTCCACACA	ACT
rs1393890	CTGCCGTACCTGGCAAGC	ACT
rs1478714	CCCCGAGGGGACAGTCCA	ACG

SNP Reference	Extend Probe	Termination Mix
rs868213	GGGCACATTCTTGAGGAGGT	ACG
rs690115	AGCCGAGGGAGCTGACCCTG	ACG
rs1465501	TCCAGGAGCCCTCAGAATG	ACT
rs899173	CCTCTGGCAAAGTGTGGAGC	ACG
rs10477	AGTACGATATCAAAGATC	ACG
rs926393	CAGGAAATGTGCTTTTCGAGTTCC	ACG
rs465271	GGCTCAAGGGATCCTCCCA	ACG
rs13847	AAGCACACCGGCACGAAC	ACT
rs738658	GAGGCATTTTCATTAATGCATG	CGT
rs756519	CAGAGCCCTGTTCTTTGATTT	ACG
rs1042327	CATCACAGCTCCCCACCAT	ACT
rs8770	TAGACACTGTGTAAGCAATC	ACG
rs1563055	TTCTCCTCACATTGTTTCTACT	ACG
rs912428	CCATTCCAGGGAGACTCCCA	ACT
rs1888475	GACATCAAATGATTCCCCTGT	ACT

[0213] The MassEXTEND™ reaction was performed in a total volume of 9 µl, with the addition of 1X ThermoSequenase buffer, 0.576 units of ThermoSequenase (Amersham Pharmacia), 600 nM MassEXTEND™ primer, 2 mM of ddATP and/or ddCTP and/or ddGTP and/or ddTTP, and 2 mM of dATP or dCTP or dGTP or dTTP. The deoxy nucleotide (dNTP) used in the assay normally was complementary to the nucleotide at the polymorphic site in the amplicon. Samples were incubated at 94°C for 2 minutes, followed by 55 cycles of 5 seconds at 94°C, 5 seconds at 52°C, and 5 seconds at 72°C.

[0214] Following incubation, samples were desalted by adding 16 µl of water (total reaction volume was 25 µl), 3 mg of SpectroCLEAN™ sample cleaning beads (Sequenom, Inc.) and allowed to incubate for 3 minutes with rotation. Samples were then robotically dispensed using a piezoelectric dispensing device (SpectroJET™ (Sequenom, Inc.)) onto either 96-spot or 384-spot silicon chips containing a matrix that crystallized each sample (SpectroCHIP™ (Sequenom, Inc.)). Subsequently, MALDI-TOF mass spectrometry (Biflex and Autoflex MALDI-TOF mass spectrometers (Bruker Daltonics) can be used) and SpectroTYPER RT™ software (Sequenom, Inc.) were used to analyze and interpret the SNP genotype for each sample.

Genetic Analysis

[0215] Minor allelic frequencies for the polymorphisms set forth in Table A were verified as being 10% or greater using the extension assay described above in a group of samples isolated from 92 individuals originating from the state of Utah in the United States, Venezuela and France (Coriell cell repositories).

[0216] Genotyping results are shown for female pools in Table 5. In Table 5, “AF” refers to allelic frequency; and “F case” and “F control” refer to female case and female control groups, respectively.

TABLE 5: Genotyping Results

SNP Reference	AF F case	AF F control	p-value
rs552	A = 0.190 G = 0.810	A = 0.123 G = 0.877	0.0011
rs12904	A = 0.455 G = 0.545	A = 0.375 G = 0.625	0.0012
rs2282146	C = 0.906 T = 0.094	C = 0.939 T = 0.061	0.0105
rs734784	G = 0.483 A = 0.517	G = 0.416 A = 0.584	0.0052
rs1042164	T = 0.233 C = 0.767	T = 0.159 C = 0.841	0.0002
rs749670	C = 0.342 T = 0.658	C = 0.419 T = 0.581	0.0038
rs955592	T = 0.045 C = 0.955	T = 0.076 C = 0.924	0.0177
rs1143016	T = 0.093 C = 0.907	T = 0.054 C = 0.946	0.0071
rs755248	G = 0.146 A = 0.854	G = 0.069 A = 0.931	0.0000
rs1055055	A = 0.432 G = 0.568	A = 0.355 G = 0.645	0.0046
rs835409	T = 0.620 G = 0.380	T = 0.681 G = 0.319	0.0222
rs927663	T = 0.301 G = 0.699	T = 0.358 G = 0.642	0.0289
rs8162	A = 0.591 G = 0.409	A = 0.657 G = 0.343	0.0149
rs831038	C = 0.617 T = 0.383	C = 0.666 T = 0.334	0.0359
rs33079	G = 0.823 A = 0.177	G = 0.881 A = 0.119	0.0013
rs1710880	C = 0.303 A = 0.697	C = 0.371 A = 0.629	0.0129
rs1078153	T = 0.818 A = 0.182	T = 0.875 A = 0.125	0.0039
rs799570	A = 0.675 G = 0.325	A = 0.740 G = 0.260	0.0100
rs1282730	G = 0.086 A = 0.914	G = 0.127 A = 0.873	0.0150
rs1518875	T = 0.033 C = 0.967	T = 0.055 C = 0.945	0.0508
rs1568694	G = 0.045 A = 0.955	G = 0.081 A = 0.919	0.0064
rs905042	A = 0.832 T = 0.168	A = 0.769 T = 0.231	0.0047
rs1957723	G = 0.778 A = 0.222	G = 0.839 A = 0.161	0.0048
rs794018	G = 0.273 A = 0.727	G = 0.220 A = 0.780	0.0034
rs707723	C = 0.759 T = 0.241	C = 0.811 T = 0.189	0.0195
rs893861	G = 0.246 A = 0.754	G = 0.196 A = 0.804	0.0251
rs1914903	G = 0.861 A = 0.139	G = 0.910 A = 0.090	0.0055
rs2062232	C = 0.064 T = 0.936	C = 0.117 T = 0.883	0.0012
rs26609	A = 0.777 T = 0.223	A = 0.840 T = 0.160	0.0039
rs1370987	A = 0.422 G = 0.578	A = 0.341 G = 0.659	0.0007
rs1012414	G = 0.876 A = 0.124	G = 0.833 A = 0.167	0.0289
rs435903	G = 0.766	G = 0.685	0.0013

SNP Reference	AF F case	AF F control	p-value
	A = 0.234	A = 0.315	
rs1248	T = 0.668 A = 0.332	T = 0.593 A = 0.407	0.0014
rs703508	G = 0.875 A = 0.125	G = 0.910 A = 0.090	0.0375
rs226465	G = 0.094 C = 0.906	G = 0.129 C = 0.871	0.0454
rs241448	C = 0.294 T = 0.706	C = 0.212 T = 0.788	0.0010
rs763155	A = 0.160 C = 0.840	A = 0.114 C = 0.886	0.0140
rs1040461	T = 0.069 C = 0.931	T = 0.098 C = 0.902	0.0281
rs462832	A = 0.218 T = 0.782	A = 0.145 T = 0.855	0.0008
rs804194	T = 0.583 C = 0.417	T = 0.679 C = 0.321	0.0004
rs1022646	A = 0.169 G = 0.831	A = 0.103 G = 0.897	0.0007
rs1569112	G = 0.853 A = 0.147	G = 0.812 A = 0.188	0.0468
rs805623	A = 0.097 G = 0.903	A = 0.140 G = 0.860	0.0143
rs1019850	A = 0.330 T = 0.670	A = 0.240 T = 0.760	0.0005
rs1599931	A = 0.581 G = 0.419	A = 0.659 G = 0.341	0.0037
AA	A = 0.506 G = 0.494	A = 0.577 G = 0.423	0.0102
rs279941	T = 0.100 G = 0.900	T = 0.138 G = 0.862	0.0324
rs1062230	C = 0.778 T = 0.222	C = 0.717 T = 0.283	0.0109
rs1859911	T = 0.295 C = 0.705	T = 0.243 C = 0.757	0.0328
rs1477261	T = 0.861 A = 0.139	T = 0.809 A = 0.191	0.0105
rs1191119	G = 0.121 A = 0.879	G = 0.078 A = 0.922	0.0079
rs657780	A = 0.674 G = 0.326	A = 0.583 G = 0.417	0.0009
rs1393890	G = 0.639 C = 0.361	G = 0.724 C = 0.276	0.0014
rs1478714	G = 0.331 A = 0.669	G = 0.269 A = 0.731	0.0136
rs868213	C = 0.078 T = 0.922	C = 0.044 T = 0.956	0.0083
rs690115	G = 0.839 A = 0.161	G = 0.784 A = 0.216	0.0111
rs1465501	A = 0.846 G = 0.154	A = 0.903 G = 0.097	0.0020
rs899173	C = 0.895 T = 0.105	C = 0.858 T = 0.142	0.0408
rs10477	C = 0.087 T = 0.913	C = 0.146 T = 0.854	0.0010
rs926393	C = 0.715 T = 0.285	C = 0.647 T = 0.353	0.0082
rs465271	C = 0.194 T = 0.806	C = 0.130 T = 0.870	0.0019
rs13847	A = 0.111 G = 0.889	A = 0.163 G = 0.837	0.0056
rs738658	C = 0.898 A = 0.102	C = 0.855 A = 0.145	0.0183
rs756519	C = 0.581 T = 0.419	C = 0.656 T = 0.344	0.0055

SNP Reference	AF F case	AF F control	p-value
rs1042327	T = 0.472 C = 0.528	T = 0.563 C = 0.437	0.0012
rs8770	C = 0.529 T = 0.471	C = 0.432 T = 0.568	0.0001
rs1563055	C = 0.653 T = 0.347	C = 0.736 T = 0.264	0.0013
rs912428	T = 0.228 C = 0.772	T = 0.170 C = 0.830	0.0076
rs1888475	A = 0.188 G = 0.812	A = 0.135 G = 0.865	0.0087

[0217] All of the single marker alleles set forth in Table A were considered validated, since the genotyping data agreed with the allelotyping data and each SNP significantly associated with osteoarthritis. Particularly significant associations with osteoarthritis are indicated by a calculated p-value of less than 0.05 for genotype results.

Example 3

Association of Polymorphic Variants with Osteoarthritis in Replication Cohorts

[0218] The single marker polymorphisms set forth in Table A were genotyped again in two replication cohorts consisting of individuals selected for OA.

Sample Selection and Pooling Strategies – Replication Sample 1

[0219] A second case control sample (replication sample #1) was created by using 100 Caucasian female cases from Chingford, UK, and 148 unrelated female cases from the St. Thomas twin study. Cases were defined as having Kellgren-Lawrence (KL) scores of at least 2 in at least one knee x-ray. In addition, 199 male knee replacement cases from Nottingham were included. (For a cohort description, see the Nottingham description provided in Example 1). The control pool was made up of unrelated female individuals from the St. Thomas twin study (England) with normal knee x-rays and without other indications of OA, regardless of anatomical location, as well as lacking family history of OA. The St. Thomas twin study consists of Caucasian, female participants from the St. Thomas' Hospital, London, adult-twin registry, which is a voluntary registry of >4,000 twin pairs ranging from 18 to 76 years of age. The replication sample 1 cohort was used to replicate the initial results. Table 6 below summarizes the selected phenotype data collected from the case and control individuals.

TABLE 6

Phenotype	Female cases (n=248): median (range)/ (n,%)	Male cases (n=199): median (range)/ (n,%)	Female controls (n=313): mean (range)/ (n,%)
Age	59 (39- 73)	66 (45- 73)	55 (50- 72)
Height (cm)	162 (141- 178)	175 (152- 198)	162 (141- 176)
Weight (kg)	68 (51- 123)	86 (62- 127)	64 (40- 111)
Body mass index	26 (18- 44)	29 (21- 41)	24 (18- 46)

Phenotype	Female cases (n=248): median (range)/ (n,%)	Male cases (n=199): median (range)/ (n,%)	Female controls (n=313): mean (range)/ (n,%)
(kg/m ²)			
Kellgren-Lawrence* left knee	0 (63, 26%), 1 (20, 8%), 2 (105, 43%), 3 (58, 23%), 4 (1, 0%)	NA	NA
Kellgren-Lawrence* right knee	0 (43, 7%), 1 (18, 7%), 2 (127, 52%), 3 (57, 23%), 4 (1, 0%)	NA	NA
KL* >2 both knees	No (145, 59%), Yes (101, 41%)	NA	NA
KL* >2 either knee	No (0, 0%), Yes (248, 100%)	NA	NA

* 0: normal, 1: doubtful, 2: definite osteophyte (bony protuberance), 3: joint space narrowing (with or without osteophyte), 4: joint deformity

Sample Selection and Pooling Strategies – Replication Sample 2

[0220] A third case control sample (replication sample #2) was created by using individuals with symptoms of OA from Newfoundland, Canada. These individuals were recruited and examined by rheumatologists. Affected joints were x-rayed and a final diagnosis of definite or probable OA was made according to American College of Rheumatology criteria by a single rheumatologist to avoid any inter-examiner diagnosis variability. Controls were recruited from volunteers without any symptoms from the musculoskeletal system based on a normal joint exam performed by a rheumatologist. Only cases with a diagnosis of definite OA were included in the study. Only individuals of Caucasian origin were included. The cases consisted of 228 individuals with definite knee OA, 106 individuals with definite hip OA, and 74 individuals with hip OA.

TABLE 7

Phenotype	Case	Control
Age at Visit	62.7	52.5
Sex (Female/Male)	227/119	174/101
Knee OA Xray: No	35% (120)	80% (16)
Unknown	1% (4)	0% (0)
Yes	64% (221)	20% (4)
Hip OA Xray: No	63% (215)	80% (16)
Unknown	2% (7)	0% (0)
Yes	35% (121)	20% (4)

Assay for Verifying, Allelotyping, and Genotyping SNPs

[0221] Genotyping of the replication cohorts described in Tables 6 and 7 was performed using the same methods used for the original genotyping, as described herein. A MassARRAY™ system

(Sequenom, Inc.) was utilized to perform SNP genotyping in a high-throughput fashion. This genotyping platform was complemented by a homogeneous, single-tube assay method (hME™ or homogeneous MassEXTEND™ (Sequenom, Inc.)) in which two genotyping primers anneal to and amplify a genomic target surrounding a polymorphic site of interest. A third primer (the MassEXTEND™ primer), which is complementary to the amplified target up to but not including the polymorphism, was then enzymatically extended one or a few bases through the polymorphic site and then terminated.

[0222] For each polymorphism, SpectroDESIGNER™ software (Sequenom, Inc.) was used to generate a set of PCR primers and a MassEXTEND™ primer which were used to genotype the polymorphism. Other primer design software could be used or one of ordinary skill in the art could manually design primers based on his or her knowledge of the relevant factors and considerations in designing such primers. Table 3 shows PCR primers and Table 4 shows extension probes used for analyzing (*e.g.*, genotyping) polymorphisms in the replication cohorts. The initial PCR amplification reaction was performed in a 5 µl total volume containing 1X PCR buffer with 1.5 mM MgCl₂ (Qiagen), 200 µM each of dATP, dGTP, dCTP, dTTP (Gibco-BRL), 2.5 ng of genomic DNA, 0.1 units of HotStar DNA polymerase (Qiagen), and 200 nM each of forward and reverse PCR primers specific for the polymorphic region of interest.

[0223] Samples were incubated at 95°C for 15 minutes, followed by 45 cycles of 95°C for 20 seconds, 56°C for 30 seconds, and 72°C for 1 minute, finishing with a 3 minute final extension at 72°C. Following amplification, shrimp alkaline phosphatase (SAP) (0.3 units in a 2 µl volume) (Amersham Pharmacia) was added to each reaction (total reaction volume was 7 µl) to remove any residual dNTPs that were not consumed in the PCR step. Samples were incubated for 20 minutes at 37°C, followed by 5 minutes at 85°C to denature the SAP.

[0224] Once the SAP reaction was complete, a primer extension reaction was initiated by adding a polymorphism-specific MassEXTEND™ primer cocktail to each sample. Each MassEXTEND™ cocktail included a specific combination of dideoxynucleotides (ddNTPs) and deoxynucleotides (dNTPs) used to distinguish polymorphic alleles from one another. Methods for verifying, allelotyping and genotyping SNPs are disclosed, for example, in U.S. Pat. No. 6,258,538, the content of which is hereby incorporated by reference. In Table 7, ddNTPs are shown and the fourth nucleotide not shown is the dNTP.

[0225] The MassEXTEND™ reaction was performed in a total volume of 9 µl, with the addition of 1X ThermoSequenase buffer, 0.576 units of ThermoSequenase (Amersham Pharmacia), 600 nM MassEXTEND™ primer, 2 mM of ddATP and/or ddCTP and/or ddGTP and/or ddTTP, and 2 mM of dATP or dCTP or dGTP or dTTP. The deoxy nucleotide (dNTP) used in the assay normally was complementary to the nucleotide at the polymorphic site in the amplicon. Samples were incubated at 94°C for 2 minutes, followed by 55 cycles of 5 seconds at 94°C, 5 seconds at 52°C, and 5 seconds at 72°C.

[0226] Following incubation, samples were desalted by adding 16 μ l of water (total reaction volume was 25 μ l), 3 mg of SpectroCLEAN™ sample cleaning beads (Sequenom, Inc.) and allowed to incubate for 3 minutes with rotation. Samples were then robotically dispensed using a piezoelectric dispensing device (SpectroJET™ (Sequenom, Inc.)) onto either 96-spot or 384-spot silicon chips containing a matrix that crystallized each sample (SpectroCHIP™ (Sequenom, Inc.)). Subsequently, MALDI-TOF mass spectrometry (Biflex and Autoflex MALDI-TOF mass spectrometers (Bruker Daltonics) can be used) and SpectroTYPER RT™ software (Sequenom, Inc.) were used to analyze and interpret the SNP genotype for each sample.

Genetic Analysis

[0227] Genotyping results for replication cohorts #1 and #2 are provided in Tables 8 and 9, respectively.

TABLE 8

rsID	Replication #1 (Mixed Male/Female cases and Female controls)				Meta-analysis Disc. + Rep #1
	AF OA Con	AF OA Cas	Delta	P-value	P-value
rs552	0.87	0.85	0.02	0.344	0.0300
rs12904	0.57	0.57	0.00	0.936	0.2700
rs2282146	0.08	0.1	-0.02	0.342	0.0190
rs734784	0.52	0.54	-0.02	0.451	0.7200
rs1042164	0.79	0.82	-0.03	0.161	0.9100
rs749670	0.62	0.66	-0.04	0.173	0.0019
rs955592	0.93	0.94	-0.01	0.521	0.0600
rs1143016	0.93	0.93	0.00	0.869	NA
rs755248	0.9	0.89	0.01	0.544	0.1600
rs1055055	0.64	0.64	0.00	0.947	0.3300
rs835409	0.34	0.35	-0.01	0.715	0.1300
rs927663	0.64	0.65	-0.01	0.611	0.0690
rs831038	0.35	0.37	-0.02	0.399	NA
rs33079	0.14	0.14	0.00	0.995	0.3100
rs1710880	0.66	0.62	0.04	0.087	0.9000
rs799570	0.29	0.29	0.00	0.903	0.2500
rs1282730	0.88	0.87	0.01	0.751	0.4800
rs1568694	0.93	0.94	0.00	0.928	0.2600
rs905042	0.21	0.2	0.01	0.829	0.2200
rs1957723	0.13	0.16	-0.03	0.124	0.0009
rs794018	0.74	0.72	0.02	0.518	0.0710
rs707723	0.18	0.19	-0.01	0.658	0.0650
rs1914903	0.15	0.14	0.01	0.605	0.5500
rs2062232	0.91	0.91	0.00	0.788	0.2100
rs26609	0.16	0.19	-0.02	0.226	0.0032
rs1370987	0.63	0.63	-0.01	0.857	0.3900
rs1012414	0.12	0.13	-0.01	0.669	0.5600
rs435903	0.27	0.27	0.00	0.950	0.2800
rs1248	0.36	0.36	0.00	0.917	0.2400

rsID	Replication #1 (Mixed Male/Female cases and Female controls)				Meta-analysis Disc. + Rep #1 P-value
	AF OA Con	AF OA Cas	Delta	P-value	
rs703508	0.11	0.12	-0.01	0.558	0.0660
rs226465	0.87	0.88	-0.01	0.436	0.0500
rs241448	0.74	0.75	-0.01	0.805	0.4100
rs763155	0.86	0.88	-0.02	0.273	0.8800
rs1040461	0.92	0.92	0.00	0.826	NA
rs1022646	0.85	0.87	-0.02	0.219	0.8200
rs1569112	0.16	0.18	-0.02	0.402	0.8800
rs805623	0.87	0.88	-0.01	0.460	0.0370
rs1019850	0.69	0.7	0.00	0.890	0.3700
AA	0.47	0.48	-0.01	0.681	0.1200
rs279941	0.87	0.89	-0.01	0.400	0.0340
rs1062230	0.26	0.26	0.00	0.896	0.4200
rs1859911	0.71	0.75	-0.04	0.128	0.9000
rs1477261	0.16	0.16	0.00	0.986	0.3000
rs1191119	0.89	0.88	0.01	0.569	0.1200
rs1393890	0.29	0.31	-0.02	0.527	0.1400
rs1478714	0.69	0.67	0.03	0.300	0.0140
rs868213	0.92	0.93	-0.01	0.455	0.7000
rs690115	0.2	0.21	-0.01	0.729	0.4900
rs1465501	0.11	0.1	0.01	0.718	0.5600
rs899173	0.1	0.11	0.00	0.924	0.3300
rs10477	0.89	0.88	0.01	0.691	0.4700
rs926393	0.3	0.31	-0.01	0.830	0.4200
rs465271	0.86	0.85	0.01	0.516	0.0660
rs13847	0.86	0.85	0.01	0.547	0.5900
rs738658	0.14	0.15	-0.01	0.536	0.6700
rs756519	0.4	0.43	-0.04	0.140	0.0098
rs1042327	0.49	0.52	-0.03	0.234	0.0430
rs8770	0.51	0.48	0.03	0.303	0.0480
rs1563055	0.31	0.35	-0.04	0.083	0.0002
rs912428	0.86	0.8	0.06	0.004	~0.00001
rs1888475	0.86	0.81	0.04	0.032	0.0002

TABLE 9

rsID	Replication #2 (Newfoundland) (Male/Female cases and controls)				Meta-analysis Disc. + Rep #2 Not Done
	AF OA Con	AF OA Cas	Delta	P-value	
rs552	0.85	0.86	-0.014	0.496	
rs12904	0.58	0.57	0.011	0.719	
rs2282146	0.08	0.08	0.002	0.876	
rs734784	0.53	0.54	-0.003	0.907	
rs1042164	0.83	0.80	0.026	0.248	
rs749670	0.66	0.62	0.036	0.208	
rs955592	0.95	0.92	0.033	0.027	
rs1143016	0.96	0.94	0.015	0.236	
rs755248	0.89	0.90	-0.009	0.608	

rsID	Replication #2 (Newfoundland) (Male/Female cases and controls)				Meta-analysis Disc. + Rep #2 Not Done
	AF OA Con	AF OA Cas	Delta	P-value	
rs1055055	0.64	0.61	0.034	0.249	
rs835409	0.36	0.31	0.047	0.101	
rs927663	0.67	0.68	-0.013	0.631	
rs831038	0.34	0.35	-0.014	0.612	
rs33079	0.17	0.19	-0.019	0.417	
rs1710880	0.64	0.62	0.029	0.309	
rs799570	0.35	0.30	0.058	0.033	
rs1282730	0.89	0.89	-0.001	0.982	
rs1568694	0.95	0.94	0.009	0.518	
rs905042	0.19	0.20	-0.002	0.933	
rs1957723	0.18	0.20	-0.017	0.454	
rs794018	0.73	0.72	0.015	0.586	
rs707723	0.20	0.21	-0.007	0.759	
rs1914903	0.14	0.16	-0.022	0.285	
rs2062232	0.92	0.91	0.008	0.632	
rs26609	0.19	0.18	0.005	0.827	
rs1370987	0.59	0.61	-0.023	0.423	
rs1012414	0.15	0.14	0.008	0.679	
rs435903	0.24	0.26	-0.026	0.316	
rs1248	0.33	0.38	-0.051	0.078	
rs703508	0.10	0.11	-0.002	0.916	
rs226465	0.89	0.89	-0.007	0.699	
rs241448	0.76	0.77	-0.007	0.778	
rs763155	0.89	0.84	0.049	0.016	
rs1040461	0.91	0.91	0.001	0.948	
rs1022646	0.86	0.86	-0.001	0.974	
rs1569112	0.16	0.17	-0.016	0.446	
rs805623	0.89	0.87	0.022	0.256	
rs1019850	0.71	0.69	0.026	0.341	
AA	0.48	0.44	0.035	0.234	
rs279941	0.91	0.87	0.037	0.047	
rs1062230	0.23	0.22	0.011	0.653	
rs1859911	0.72	0.71	0.015	0.560	
rs1477261	0.17	0.14	0.031	0.143	
rs1191119	0.86	0.88	-0.017	0.377	
rs1393890	0.30	0.28	0.017	0.516	
rs1478714	0.68	0.70	-0.025	0.358	
rs868213	0.91	0.93	-0.019	0.260	
rs690115	0.19	0.18	0.005	0.811	
rs1465501	0.10	0.12	-0.020	0.282	
rs899173	0.14	0.12	0.020	0.319	
rs10477	0.86	0.88	-0.016	0.442	
rs926393	0.37	0.32	0.042	0.137	
rs465271	0.87	0.85	0.023	0.263	
rs13847	0.84	0.85	-0.012	0.582	
rs738658	0.18	0.15	0.021	0.340	
rs756519	0.39	0.40	-0.007	0.816	
rs1042327	0.49	0.51	-0.024	0.405	
rs8770	0.53	0.49	0.039	0.195	

rsID	Replication #2 (Newfoundland) (Male/Female cases and controls)				Meta-analysis Disc. + Rep #2 Not Done
	AF OA Con	AF OA Cas	Delta	P-value	
rs1563055	0.34	0.34	-0.005	0.864	
rs912428	0.82	0.76	0.058	0.016	
rs1888475	0.80	0.82	-0.025	0.280	

[0228] To combine the evidence for association from multiple sample collections, a meta-analysis procedure was employed. The allele frequencies were compared between cases and controls within the discovery sample, as well as within the replication cohort #1 using the DerSimonian-Laird approach (DerSimonian, R. and N. Laird. 1986. Meta-analysis in clinical trials. Control Clin Trials 7: 177-188.)

[0229] The absence of a statistically significant association in one or more of the replication cohorts should not be interpreted as minimizing the value of the original finding. There are many reasons why a biologically derived association identified in a sample from one population would not replicate in a sample from another population. The most important reason is differences in population history. Due to bottlenecks and founder effects, there may be common disease predisposing alleles present in one population that are relatively rare in another, leading to a lack of association in the candidate region. Also, because common diseases such as arthritis-related disorders are the result of susceptibilities in many genes and many environmental risk factors, differences in population-specific genetic and environmental backgrounds could mask the effects of a biologically relevant allele. For these and other reasons, statistically strong results in the original, discovery sample that did not replicate in one or more of the replication samples may be further evaluated in additional replication cohorts and experimental systems.

Example 4

KIAA0296 Region Proximal SNPs

[0230] SNP rs749670 is associated with osteoarthritis and is described in Table A. It lies within the *KIAA0296* gene and codes for a G327E amino acid change. The thymine allele of SNP rs749670 is associated with osteoarthritis (see Table 5) and codes for glutamic acid. *KIAA0296* shares homology with C2H2-type Zn-finger protein and is likely a novel transcription factor. One-hundred one additional allelic variants proximal to rs749670 were identified and subsequently allelotyped in osteoarthritis case and control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 10. The chromosome positions provided in column four of Table 10 are based on Genome "Build 34" of NCBI's GenBank.

TABLE 10

dbSNP rs#	Chromosome	Position in SEQ ID NO: 1	Chromosome Position	Allele Variants
rs7500176	16	247	31077197	a/g
rs6565212	16	1535	31078485	c/t

dbSNP rs#	Chromosome	Position in SEQ ID NO: 1	Chromosome Position	Allele Variants
rs8054046	16	2386	31079336	c/t
rs8056842	16	6440	31083390	c/t
rs732173	16	9133	31086083	g/t
rs732172	16	9143	31086093	a/g
rs7188557	16	9471	31086421	a/t
rs2288004	16	13150	31090100	c/g
rs4337310	16	13717	31090667	c/t
rs2016554	16	14466	31091416	a/g
rs6565213	16	15769	31092719	a/c
rs7204762	16	16870	31093820	a/g
rs4889529	16	18545	31095495	c/t
rs6565214	16	18749	31095699	c/t
rs7499674	16	19123	31096073	g/t
rs6565215	16	20736	31097686	a/g
rs1023623	16	21038	31097988	c/t
rs1023624	16	21046	31097996	c/t
rs1023625	16	21050	31098000	c/t
rs1549297	16	21056	31098006	a/t
rs3084894	16	21706	31098656	-/acc
rs8048228	16	23170	31100120	a/g
rs7405432	16	25028	31101978	a/t
rs8054249	16	27871	31104821	a/g
rs8061047	16	28070	31105020	c/t
rs7187220	16	31717	31108667	a/g
rs8046978	16	32019	31108969	a/g
rs2288003	16	32318	31109268	a/g
rs7196421	16	33080	31110030	a/g
rs7196431	16	33101	31110051	a/g
rs7203158	16	34236	31111186	a/g
rs2303223	16	34285	31111235	c/t
rs2032917	16	34818	31111768	c/g
rs8044134	16	35168	31112118	c/g
rs4889531	16	37981	31114931	c/t
rs4889532	16	38113	31115063	c/g
rs4889533	16	38117	31115067	c/t
rs881929	16	38481	31115431	g/t
rs8047104	16	38615	31115565	c/g
rs8047803	16	38944	31115894	a/c
rs4644874	16	39288	31116238	a/c
rs2359673	16	41385	31118335	c/t
rs4435271	16	42136	31119086	a/t
rs7197717	16	42185	31119135	a/c
rs2359674	16	42353	31119303	a/g
rs6565217	16	42434	31119384	a/g
rs2303222	16	44580	31121530	a/g
rs4889615	16	44675	31121625	a/t
rs4624197	16	45739	31122689	g/t
rs3751853	16	46439	31123389	c/t
rs749671	16	47457	31124407	c/t
rs749670	16	47735	31124685	c/t
rs3751855	16	50319	31127269	c/t
rs3751856	16	50708	31127658	a/g

dbSNP rs#	Chromosome	Position in SEQ ID NO: 1	Chromosome Position	Allele Variants
rs7196726	16	51185	31128135	a/g
rs889550	16	53002	31129952	a/g
rs750952	16	53064	31130014	c/t
rs2077633	16	53637	31130587	a/g
rs7199949	16	55274	31132224	c/g
rs2032916	16	55825	31132775	c/t
rs4468641	16	55986	31132936	a/c
rs4889535	16	56684	31133634	c/g
rs4316775	16	57653	31134603	c/t
rs4313819	16	57659	31134609	c/g
rs6565218	16	57692	31134642	g/t
rs4318224	16	57775	31134725	c/t
rs1046030	16	61313	31138263	c/t
rs7294	16	61431	31138381	a/g
rs7200749	16	61699	31138649	a/g
rs2359612	16	62906	31139856	a/g
rs8050894	16	63619	31140569	c/g
rs2884737	16	64664	31141614	a/c
rs1895514	16	68452	31145402	g/t
rs8060209	16	69665	31146615	c/t
rs8060217	16	69681	31146631	c/t
rs7196161	16	70091	31147041	a/g
rs8062336	16	74637	31151587	a/g
rs8043778	16	74760	31151710	a/g
rs2032915	16	76523	31153473	a/g
rs4889616	16	78559	31155509	c/g
rs1045564	16	79549	31156499	a/c
rs2303221	16	79882	31156832	c/t
rs1549296	16	81339	31158289	a/g
rs889555	16	81681	31158631	c/t
rs5816521	16	81696	31158646	-/g
rs749767	16	83517	31160467	c/t
rs2884738	16	85431	31162381	a/c
rs2052581	16	86332	31163282	c/t
rs4889617	16	87358	31164308	a/g
rs4889619	16	87725	31164675	c/t
rs1978487	16	89052	31166002	a/g
rs1978486	16	90020	31166970	a/g
rs1978485	16	90231	31167181	a/g
rs4889620	16	90284	31167234	a/g
rs4889621	16	90447	31167397	c/t
rs3214477	16	90601	31167551	-/g
rs4527034	16	90724	31167674	a/g
rs1060506	16	92559	31169509	c/t
rs7200125	16	95176	31172126	a/g
rs6565219	16	95195	31172145	c/t
rs889548	16	96822	31173772	a/g

Assay for Verifying and Allelotyping SNPs

[0231] The methods used to verify and allelotype the 101 proximal SNPs of Table 10 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 11 and Table 12, respectively.

TABLE 11

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs7500176	ACGTTGGATGACAGTGGCTCATGCCTGTAA	ACGTTGGATGTTTCACCATATTGGCCAGGC
rs6565212	ACGTTGGATGTTAGGAAGGATGTGGAAGGG	ACGTTGGATGGACCTGACCTCAAAGAGAAG
rs8054046	ACGTTGGATGCACTGAAGTTTAGAGCAGCC	ACGTTGGATGTGCACAGTGGGTAACTGTAG
rs8056842	ACGTTGGATGATGAGGTTTCACCTTGTTGG	ACGTTGGATGATCATAGCACTTTGCGAGGC
rs732173	ACGTTGGATGAGACCAGGCTCAGTCCAAAC	ACGTTGGATGTGGCCAAACCTGGAAGACAC
rs732172	ACGTTGGATGCTCAGTCCAAACTGCCAGAC	ACGTTGGATGCATGGCCAAACCTGGAAGAC
rs7188557	ACGTTGGATGAACATCTGTACAAGGCTGGG	ACGTTGGATGATTGGCTGTAGCATGACTGA
rs2288004	ACGTTGGATGAAAGACACTGGAAGGCTGTG	ACGTTGGATGAGAGAAGGTGGAGCTCTTTC
rs4337310	ACGTTGGATGAGGGAAGAGATGTACACAGG	ACGTTGGATGTTTGGAGCAGATCTGGTAGG
rs2016554	ACGTTGGATGAAGCAATCCTCCCACCTCAG	ACGTTGGATGCAAGAGCAAACTCCCTCTC
rs6565213	ACGTTGGATGAGATGGAGTCTCACTCCATC	ACGTTGGATGTGAGGCAGGAGAATCGCTTG
rs7204762	ACGTTGGATGAGTGGCTCACACCTGTAATC	ACGTTGGATGGCTGGTCTTGAACCTTCTGAC
rs4889529	ACGTTGGATGCAAGCAATCCTTGCTCAAG	ACGTTGGATGGGTGGTTCACATCTGCAATC
rs6565214	ACGTTGGATGTGATCTCGGCTCACTGCAAG	ACGTTGGATGAAAATTAGCCGGGCATGGTG
rs7499674	ACGTTGGATGAACTAGGGAACCTTCCCAC	ACGTTGGATGTGGGCCCCACTAAGTCTAAA
rs6565215	ACGTTGGATGAGACGGAAAGTTCCAGCTTG	ACGTTGGATGTGGGACCACTCTGTTCTATG
rs1023623	ACGTTGGATGACAGAGCAAGACTCCATCTC	ACGTTGGATGTCCTCTTCAGAGCTGTTTAC
rs1023624	ACGTTGGATGTGACAGAGCAAGACTCCATC	ACGTTGGATGGTCCTAACCAGTGAGCCTAT
rs1023625	ACGTTGGATGTGGTGACAGAGCAAGACTCC	ACGTTGGATGTCAGGTCCTAACCAGTGAGC
rs1549297	ACGTTGGATGTTGCATTGATCCGAGATCGC	ACGTTGGATGTCAGGTCCTAACCAGTGAGC
rs3084894	ACGTTGGATGTCCAGGTTCAAGCGATTCT	ACGTTGGATGCCATGAAACCCCATCTCTAC
rs8048228	ACGTTGGATGAATTGCTTGAACCTGGGAGG	ACGTTGGATGTTTCGACAGTCTCCCTCTATC
rs7405432	ACGTTGGATGAGATCATGCCACTGCACTAC	ACGTTGGATGCACTGCACTTGGCCTAATTG
rs8054249	ACGTTGGATGATCTCCTGACCTCATGATCT	ACGTTGGATGTAATCAAACACCAGGCTGGG
rs8061047	ACGTTGGATGATGATCACAGCTCACTGCAG	ACGTTGGATGCTCCCTGCCTCTACAAAAG
rs7187220	ACGTTGGATGAAGGAGACCTTCTCCACAAT	ACGTTGGATGCCGGTCAGAGAAGCTCTTGC
rs8046978	ACGTTGGATGTGCACAGGAGCTGGTGGTG	ACGTTGGATGATCACACCACCTGACTCCGG
rs2288003	ACGTTGGATGACCGGCCGTTCAAGTGCCTG	ACGTTGGATGAGAGTGCACCAGCGCGTGC
rs7196421	ACGTTGGATGTTACGCCATTCTCCTGCCT	ACGTTGGATGAAATTAGCCAGGCGTGGTGG
rs7196431	ACGTTGGATGAGATCTCGGCTCACTGCAAG	ACGTTGGATGATGTAGTCCCAGCTACTCGG
rs7203158	ACGTTGGATGAAGCCTATGCGGAGCTCAAG	ACGTTGGATGATTGGCTGCAGCAACGCTGT
rs2303223	ACGTTGGATGACCCTCACCGCTCATGGTTG	ACGTTGGATGTGCGGCCCTACAGCTGTGA
rs2032917	ACGTTGGATGCCTGGGCGCGTTTGAAATG	ACGTTGGATGAGCCCCCGGCTACAAGCGCT
rs8044134	ACGTTGGATGACTAAGAAAGGAGGCTGAGG	ACGTTGGATGACAGTGTTTGAAAAGCCCG
rs4889531	ACGTTGGATGATTCTCACCCTCACTGTCTC	ACGTTGGATGGACCGTGTGTAATGTACTGC
rs4889532	ACGTTGGATGGGGACAAGAATCCCTATCTC	ACGTTGGATGTAGAGCCAGACACATTGCTG
rs4889533	ACGTTGGATGCTCTGTAAAGTAGGGACAAG	ACGTTGGATGTAGAGCCAGACACATTGCTG
rs881929	ACGTTGGATGTTGACCCAGTGTTCTGAGC	ACGTTGGATGCCAGCTACCTGGTGTCTAAC
rs8047104	ACGTTGGATGGTGGGATGTTAGACAGAGAC	ACGTTGGATGTGCCAGGTTGGTCTCAGCAT
rs8047803	ACGTTGGATGAAAGTGCTGGGATTACAGGC	ACGTTGGATGAAATACAGATTCCTGAGGCC
rs4644874	ACGTTGGATGAGTCTTGCTATGTTGCCTGG	ACGTTGGATGTAATCCCAGCACTTTGGGAG
rs2359673	ACGTTGGATGGTGTGATGTCAGTTCACTGC	ACGTTGGATGATCCCAAATACTTGGGAGGC
rs4435271	ACGTTGGATGACAGTGGTCTCAAGAACTCC	ACGTTGGATGTGGCTCATGCCTGTAATCAC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs7197717	ACGTTGGATGTGTGATTACAGGCATGAGCC	ACGTTGGATGGCTTGCAAGGAGTATTGTCC
rs2359674	ACGTTGGATGGCCTAGCAGTTCATTATGAG	ACGTTGGATGCCTTGTCTCCAAATACAGTC
rs6565217	ACGTTGGATGAAGAACGCTAATCCTACTGG	ACGTTGGATGTGGAGACAAGGCCTTTATGG
rs2303222	ACGTTGGATGTTGGGAAAAGTCCTCCAGAG	ACGTTGGATGGCGCAGAAAGGGAGAAAAAG
rs4889615	ACGTTGGATGTAAGTTCTAGGTCTGCACGG	ACGTTGGATGATGCACCGGAACGATTCTAG
rs4624197	ACGTTGGATGCGCTAAGAGAGTCTTTTGGG	ACGTTGGATGCAGAGCGAGACTCCATCTCA
rs3751853	ACGTTGGATGTCCCCTAGGCTTAAGTCATC	ACGTTGGATGGGTCTGTGATCAGAAGTAGG
rs749671	ACGTTGGATGTGACTACATTTGTACCGCCG	ACGTTGGATGTCAGTAGTGAAC TTCACAGG
rs749670	ACGTTGGATGTCTCATCTGTGTGCCCATTG	ACGTTGGATGATGAGGGTGAAAGGCAGGAG
rs3751855	ACGTTGGATGAAGAAGAGGTGTGGGAGGAG	ACGTTGGATGTCAGAGCTGGCTTCAGTCTG
rs3751856	ACGTTGGATGAGCTGTACTGGCCCGTCTCG	ACGTTGGATGCAGTGCGGGCGGACCTATC
rs7196726	ACGTTGGATGGACCTAGTTAGGAACTGAGG	ACGTTGGATGTCAGGGCAGCAAGCTCAGAAG
rs889550	ACGTTGGATGTCCACCCAGCACTGCTGGA	ACGTTGGATGCAGGTCCTGCTGAGGGAAC
rs750952	ACGTTGGATGTTCCCTCAGCAGGACCTGG	ACGTTGGATGGGTGGCCACTAGATGGAATG
rs2077633	ACGTTGGATGTTTCTCAGGAGTAGTTCGGG	ACGTTGGATGAAAGAAGCCAGATCTGGGTC
rs7199949	ACGTTGGATGTCCCATCAGGCAGGTGGT	ACGTTGGATGCAGCCTGTGACACTGGGAG
rs2032916	ACGTTGGATGGTTCCTCATTACTGAAGG	ACGTTGGATGTGCCACTTGCCTGTAGTTAC
rs4468641	ACGTTGGATGATGAGTCAGGAATACGGGAG	ACGTTGGATGAATGCCCTACTTGTCACTC
rs4889535	ACGTTGGATGCTATGGCAGACACCCTCTGA	ACGTTGGATGGAAGAGAAGGAGCAGAAGGG
rs4316775	ACGTTGGATGAGTAGCTCACGCTTGTAATC	ACGTTGGATGCTATGTTGCACAGGCTAGTC
rs4313819	ACGTTGGATGTGCACAGGCTAGTCTTGAAC	ACGTTGGATGAGTAGCTCACGCTTGTAATC
rs6565218	ACGTTGGATGTTAAAGTCACAGACTGAGGC	ACGTTGGATGTTGAACTCTTGGGCTCAAGC
rs4318224	ACGTTGGATGTCAGTCTGTGACTTTAAGCG	ACGTTGGATGACCACCTTTCATGGTAGAAG
rs1046030	ACGTTGGATGGTCTCCAAAGCTCTTCCATT	ACGTTGGATGGATTGATCTAAGAACTTTA
rs7294	ACGTTGGATGGCACTGGGTGTAAAAAAGAG	ACGTTGGATGTTCTAGATTACCCCTCCTC
rs7200749	ACGTTGGATGGAGCACGAAGAACAGGATCC	ACGTTGGATGTCTGTCCTGATGCTGCTGAG
rs2359612	ACGTTGGATGAAATCGGCCAAGTCTGAACC	ACGTTGGATGTCCAGAGAAGGCATCACTGA
rs8050894	ACGTTGGATGAATCTTGGTGATCCACACAG	ACGTTGGATGTAGTTACCTCCCCACATCCC
rs2884737	ACGTTGGATGTCATTATGCTAACGCCTGGC	ACGTTGGATGTTGACGATGGTCTCAAGGAC
rs1895514	ACGTTGGATGCAATCTCAGCTCACTGCAAC	ACGTTGGATGTAATCCCAGCTACTTGGGAG
rs8060209	ACGTTGGATGGGTCAGGAGTTTAAGACAAG	ACGTTGGATGCCATGCCCGGCTAATTTTG
rs8060217	ACGTTGGATGTGAGTAGCTGGGATTACAGG	ACGTTGGATGAGACAAGCTTGGCCAACATG
rs7196161	ACGTTGGATGGTGTTTTTAGTAGAGACGGG	ACGTTGGATGATCCCAGCACTTTAGGAAGC
rs8062336	ACGTTGGATGTGCTCCCCACATCTCAGACG	ACGTTGGATGAAGCGAGGAGCGCCTCTTC
rs8043778	ACGTTGGATGTTCCCTCACTTCTCAGACGGG	ACGTTGGATGATCGTCTGAGATGTGGGGAG
rs2032915	ACGTTGGATGATTCCCACCCGTTCTTTCCC	ACGTTGGATGTTCCCGCTCCCTTTTACCAC
rs4889616	ACGTTGGATGGAACCAAGAACTGGAAGGAG	ACGTTGGATGTGTAAAGCGCACAGATCACG
rs1045564	ACGTTGGATGTGTCAGCATCCTCGACGCAC	ACGTTGGATGACCCAGGCGACCCAAAATGG
rs2303221	ACGTTGGATGAGAACCCCCAACACTCTCCC	ACGTTGGATGAGCGGAGAAGGTGCGCAAG
rs1549296	ACGTTGGATGATGCTGCTGAAC TTCCTAAC	ACGTTGGATGAGCAGGGTTTCTCAACCATG
rs889555	ACGTTGGATGAGACCAGTAGGTACAAGCAC	ACGTTGGATGTCAAGAATGCCATGAGGTGG
rs5816521	ACGTTGGATGATTGTGGCTCTATGCAGAGG	ACGTTGGATGTCAAGAATGCCATGAGGTGG
rs749767	ACGTTGGATGCTGATAGAAAGGACCAAGGA	ACGTTGGATGCTGGAGTTCTGATTCAGGTC
rs2884738	ACGTTGGATGAGAACTGCTTGAACCCAGGA	ACGTTGGATGATGGAGTCTTGTGTGTCGG
rs2052581	ACGTTGGATGTGGGACATGCGGATATGGAG	ACGTTGGATGGAGGGTTTCTGTGAGAGTCAG
rs4889617	ACGTTGGATGCAGAGCGAGACTCCATCTCA	ACGTTGGATGACACTCGCGCTGGCCTAATG
rs4889619	ACGTTGGATGAAAATTAGATGGGCGTGGTG	ACGTTGGATGATCTCGGCTCACTGCAACCT
rs1978487	ACGTTGGATGTCCCTTCTCTATGTTCTGCTG	ACGTTGGATGATGGAGGAAGACAGAGAGAG
rs1978486	ACGTTGGATGTACCTAGGGTCACAGATTTG	ACGTTGGATGGGGTATGTGGTAAATGAGC
rs1978485	ACGTTGGATGTCAAGCAATTTTCTGCTGCTC	ACGTTGGATGCCATCTGTACCAAAAAGACG
rs4889620	ACGTTGGATGTGGCAAAACCCCATCTGTAC	ACGTTGGATGAGTAGTTGGGATTACAGGTG
rs4889621	ACGTTGGATGTACTCAATCACTGCCACAAC	ACGTTGGATGGCCAGTTATTTTCTCATTCG

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs3214477	ACGTTGGATGACTCGAGACTGGATCACTTC	ACGTTGGATGCCTTTTGTTCAGCCTTACC
rs4527034	ACGTTGGATGAAGTATGGGCCATAAGAGTG	ACGTTGGATGTATGTACACTACGTGGGCTG
rs1060506	ACGTTGGATGATCAGGAGTGCAAACCAGAG	ACGTTGGATGGGATGAAGCTGCAATAGCTG
rs7200125	ACGTTGGATGATTTTGCCATTGCACTCCAG	ACGTTGGATGTACAGGCATGAGCCATAGCC
rs6565219	ACGTTGGATGCTTGGCCTCTCAAAGTGCTG	ACGTTGGATGAGGGCGAGGCTCCATTTC
rs889548	ACGTTGGATGCTGGCCAAGTCCTAATACAG	ACGTTGGATGCCCAATTCCAGAGATGTCAG

TABLE 12

dbSNP rs#	Extend Primer	Term Mix
rs7500176	GATCACGAGGTCAGGAGTTC	ACT
rs6565212	GCTGGAAACTGTTGAGGGT	ACT
rs8054046	TTTAGAGCAGCCGATACCCA	ACG
rs8056842	GCTGGTCTCGAACTCCTGA	ACG
rs732173	GCTCAGTCCAACTGCCAG	CGT
rs732172	ACTGCCAGACTCCCGCCA	ACG
rs7188557	CCTGGCCCTGGTTGTGAGT	CGT
rs2288004	CGGCAGATCCAGTGTGTC	ACT
rs4337310	CACGGAATCTCCAGTGAC	ACT
rs2016554	GGCACGTACCACTGACATG	ACG
rs6565213	GCAGTGGCGCAATCTTGAC	ACT
rs7204762	CCCAGCACTTTGGGAGGC	ACG
rs4889529	CTCAAGTGATCCTCCTGCCT	ACG
rs6565214	GAGTAGCTGGGACTACAGG	ACG
rs7499674	GTTCTTCTCAACATCTGCCCA	ACT
rs6565215	TTTCCTTCAGACAGGGCTCT	ACT
rs1023623	GACTCCATCTCAAAAAAAAAAAAAA	ACT
rs1023624	GAGCAAGACTCCATCTCAAAAAA	ACT
rs1023625	CAGAGCAAGACTCCATCTCA	ACT
rs1549297	GGTGACAGAGCAAGACTCC	CGT
rs3084894	CGAGTAGGTGGGACTACAG	ACT
rs8048228	TGAGCCGAGATGGCAACAC	ACG
rs7405432	CTACAGGCTAGGAGACAGAG	CGT
rs8054249	AAAGTGCTGGGATTACAGGC	ACT
rs8061047	CCTCCTGAGGAGCTGGTCT	ACT
rs7187220	GGCCCTTCCCCTGCACC	ACG
rs8046978	AGAGTTCAGCCGCCCGG	ACG
rs2288003	GTGACAAGACGTTCTGTTGC	ACT
rs7196421	CTCAGCCTCCCGAGTAGC	ACG
rs7196431	CGGGTTCACGCCATTCTCC	ACG
rs7203158	CAACCATGAGCGGTGAGGG	ACG
rs2303223	TTGAGCTCCGCATAGGCTTT	ACT
rs2032917	TGGAAATGTCTTGGTACAGGACA	ACT
rs8044134	CCTACACGTCCCCCCCC	ACT
rs4889531	CAACTCTGTCAGGTAAGTACT	ACT
rs4889532	CAAGAATCCCTATCTCAGAAAG	ACT
rs4889533	GGACAAGAATCCCTATCTCAG	ACT

dbSNP rs#	Extend Primer	Term Mix
rs881929	CTGCCTCTTGCCAGCTCTG	ACT
rs8047104	CAGAGACCTAGCCTACCTG	ACT
rs8047803	TTACAGGCGAGAGCCACCA	CGT
rs4644874	GGGCTCAAGTGATCCTCCC	CGT
rs2359673	ACTGCGACCTCTGCCTCC	ACG
rs4435271	GCTTCAGATGCTCCTCCACT	CGT
rs7197717	GCATGAGCCGTGACCAGC	CGT
rs2359674	GAATGTTTGTGTTCCCTGTCC	ACT
rs6565217	CCAGGGCCATACCCTTATGA	ACG
rs2303222	AAAGTGTCAACCAAAGTAC	ACG
rs4889615	GCGGCGTCTTTGCACGCTA	CGT
rs4624197	AGAGAGTCTTTTGGGGTTTTTT	ACT
rs3751853	CCTACAGGTATAGCTAAGGAA	ACT
rs749671	ATTTGTACCGCCGCTCCTC	ACG
rs749670	GGTGGTGGGCATCCCTTTC	ACG
rs3751855	AGAGCCCAGGCTGGAGAC	ACG
rs3751856	CCGTCTCGTGGCTGCGC	ACG
rs7196726	GTTAGGAAGTGAAGGAACCCAG	ACG
rs889550	AGCACTGCTGGAAGCCGC	ACT
rs750952	GCTGGCCTCTCCACCTCC	ACG
rs2077633	CCATATCTTCTCCTCTCCCC	ACG
rs7199949	CAGGCAGGTGGTGGTCAG	ACT
rs2032916	CCAAAGTTCCAGAGAGGTTAA	ACT
rs4468641	ATACGGGAGGCAGGCCCA	ACT
rs4889535	CAGACACCCTCTGATTGCAG	ACT
rs4316775	GAGGATCGCTTGAGCCCAA	ACT
rs4313819	GCTAGTCTTGAAGTCTTGGG	ACT
rs6565218	CTCACGCTTGTAATCCCAGC	CGT
rs4318224	TTCCCTTGCAACCTGAGTTTT	ACG
rs1046030	GCCCAGGGAGGGAAGGTT	ACG
rs7294	TTGGTCCATTGTCATGTG	ACG
rs7200749	GAAGAACAGGATCCAGGCCA	ACT
rs2359612	CCATGTGTCAGCCAGGACC	ACT
rs8050894	CCAGCTAGCTGCTCATCAC	ACT
rs2884737	TCGCCAACACCCCCCTTC	CGT
rs1895514	CCCCTCTCGGGTTCAAGC	CGT
rs8060209	TGGCCAACATGGCGAAACC	ACG
rs8060217	CCATGCCCGGCTAATTTTTGT	ACT
rs7196161	AACTCCTGACCTCATGATCC	ACT
rs8062336	TCACTTCCTAGATGGGAAGG	ACG
rs8043778	CGCTCCTCACCTCCCAGA	ACG
rs2032915	TTCTTTCCCAACGTCCTGGA	ACT
rs4889616	GAAGTGAAGGAGGACAAGA	ACT
rs1045564	GTCCCTGAAGTCGGAGAAG	CGT
rs2303221	CTCTCCCTCCCGCCTACAT	ACG
rs1549296	TGCACGGGGCAGCCCCT	ACT
rs889555	AGCACCCCGGTTCTGTCC	ACT
rs5816521	CCAGTAGGTACAAGCACCC	ACT
rs749767	GACCAAGGATTTGGGCAAAG	ACT

dbSNP rs#	Extend Primer	Term Mix
rs2884738	CCAGGAGGTGGAGGTTGCA	ACT
rs2052581	GGATATGGAGGGCCGATTGT	ACT
rs4889617	GAGACTCCATCTCAAAAAAAAAAA	ACT
rs4889619	GCAGAGGAATCGCTTGAACC	ACG
rs1978487	GTTCTGCAACATTTTTTTCCTA	ACG
rs1978486	GGGTCACAGATTGAAAAGTG	ACT
rs1978485	TTTTCTGCCTCAGCCTCC	ACG
rs4889620	ACCCCATCTGTACCAAAAAGA	ACG
rs4889621	CTGTGAGGTGGATCAGGTTG	ACT
rs3214477	GCAGAATCTGTGATGGAAAAAG	ACT
rs4527034	CCAGGGCAGCCAACTCCC	ACG
rs1060506	AAGTCTCCAGACACCCAGA	ACG
rs7200125	AGGCTCCATTTCAAAAAAAAAAAAA	ACT
rs6565219	AAAGTGCTGGGATTACAGGC	ACT
rs889548	AGTCCTAATACAGTGGATGTC	ACT

Genetic Analysis

[0232] Allelotyping results from the discovery cohort are shown for cases and controls in Table 13. The allele frequency for the A2 allele is noted in the fifth and sixth columns for osteoarthritis case pools and control pools, respectively, where “AF” is allele frequency. The allele frequency for the A1 allele can be easily calculated by subtracting the A2 allele frequency from 1 ($A1\ AF = 1 - A2\ AF$). For example, the SNP rs732173 has the following case and control allele frequencies: case A1 (G) = 0.55; case A2 (T) = 0.45; control A1 (G) = 0.58; and control A2 (T) = 0.42, where the nucleotide is provided in paranthesis. Some SNPs are labeled “untyped” because of failed assays.

TABLE 13

dbSNP rs#	Position in SEQ ID NO: 1	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs7500176	247	31077197	A/G			
rs6565212	1535	31078485	C/T			
rs8054046	2386	31079336	C/T			
rs8056842	6440	31083390	C/T			
rs732173	9133	31086083	G/T	0.45	0.42	0.382
rs732172	9143	31086093	A/G			
rs7188557	9471	31086421	A/T			
rs2288004	13150	31090100	C/G	0.52	0.45	0.026
rs4337310	13717	31090667	C/T	0.18	untyped	
rs2016554	14466	31091416	A/G			
rs6565213	15769	31092719	A/C			
rs7204762	16870	31093820	A/G			
rs4889529	18545	31095495	C/T			
rs6565214	18749	31095699	C/T			
rs7499674	19123	31096073	G/T			
rs6565215	20736	31097686	A/G			
rs1023623	21038	31097988	C/T	0.02	untyped	
rs1023624	21046	31097996	C/T	0.16	0.11	0.035
rs1023625	21050	31098000	C/T	0.32	NA	
rs1549297	21056	31098006	A/T			

dbSNP rs#	Position in SEQ ID NO: 1	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs3084894	21706	31098656	-/ACC			
rs8048228	23170	31100120	A/G	0.54	0.61	0.040
rs7405432	25028	31101978	A/T	0.35	0.43	0.025
rs8054249	27871	31104821	A/G			
rs8061047	28070	31105020	C/T	0.21	0.21	0.903
rs7187220	31717	31108667	A/G			
rs8046978	32019	31108969	A/G	0.34	0.28	0.083
rs2288003	32318	31109268	A/G			
rs7196421	33080	31110030	A/G			
rs7196431	33101	31110051	A/G			
rs7203158	34236	31111186	A/G			
rs2303223	34285	31111235	C/T	0.52	0.45	0.060
rs2032917	34818	31111768	C/G			
rs8044134	35168	31112118	C/G	0.97	0.97	0.856
rs4889531	37981	31114931	C/T			
rs4889532	38113	31115063	C/G			
rs4889533	38117	31115067	C/T			
rs881929	38481	31115431	G/T	0.38	0.34	0.228
rs8047104	38615	31115565	C/G	0.60	0.65	0.117
rs8047803	38944	31115894	A/C	0.35	0.33	0.437
rs4644874	39288	31116238	A/C			
rs2359673	41385	31118335	C/T	0.18	0.20	0.563
rs4435271	42136	31119086	A/T			
rs7197717	42185	31119135	A/C			
rs2359674	42353	31119303	A/G	0.22	0.18	0.122
rs6565217	42434	31119384	A/G	0.35	0.33	0.608
rs2303222	44580	31121530	A/G	0.60	0.52	0.022
rs4889615	44675	31121625	A/T			
rs4624197	45739	31122689	G/T			
rs3751853	46439	31123389	C/T			
rs749671	47457	31124407	C/T	0.32	0.37	0.095
rs749670	47735	31124685	C/T			
rs3751855	50319	31127269	C/T	0.53	0.57	0.287
rs3751856	50708	31127658	A/G			
rs7196726	51185	31128135	A/G	0.41	0.37	0.258
rs889550	53002	31129952	A/G			
rs750952	53064	31130014	C/T	0.43	0.41	0.535
rs2077633	53637	31130587	A/G			
rs7199949	55274	31132224	C/G	0.46	0.53	0.051
rs2032916	55825	31132775	C/T			
rs4468641	55986	31132936	A/C	0.26	0.25	0.902
rs4889535	56684	31133634	C/G			
rs4316775	57653	31134603	C/T			
rs4313819	57659	31134609	C/G			
rs6565218	57692	31134642	G/T			
rs4318224	57775	31134725	C/T			
rs1046030	61313	31138263	C/T			
rs7294	61431	31138381	A/G	0.38	0.37	0.669
rs7200749	61699	31138649	A/G			
rs2359612	62906	31139856	A/G	0.56	0.48	0.017
rs8050894	63619	31140569	C/G	0.48	0.45	0.320
rs2884737	64664	31141614	A/C	0.68	0.60	0.016
rs1895514	68452	31145402	G/T			
rs8060209	69665	31146615	C/T			
rs8060217	69681	31146631	C/T			
rs7196161	70091	31147041	A/G			
rs8062336	74637	31151587	A/G			
rs8043778	74760	31151710	A/G			
rs2032915	76523	31153473	A/G	0.43	0.41	0.505
rs4889616	78559	31155509	C/G			
rs1045564	79549	31156499	A/C			
rs2303221	79882	31156832	C/T			
rs1549296	81339	31158289	A/G			

dbSNP rs#	Position in SEQ ID NO: 1	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs889555	81681	31158631	C/T	0.49	0.50	0.740
rs5816521	81696	31158646	-/G			
rs749767	83517	31160467	C/T	0.28	0.36	0.020
rs2884738	85431	31162381	A/C			
rs2052581	86332	31163282	C/T			
rs4889617	87358	31164308	A/G			
rs4889619	87725	31164675	C/T			
rs1978487	89052	31166002	A/G	0.62	0.57	0.124
rs1978486	90020	31166970	A/G			
rs1978485	90231	31167181	A/G	0.90	0.88	0.513
rs4889620	90284	31167234	A/G			
rs4889621	90447	31167397	C/T			
rs3214477	90601	31167551	-/G			
rs4527034	90724	31167674	A/G	0.37	0.43	0.079
rs1060506	92559	31169509	C/T	0.29	0.28	0.720
rs7200125	95176	31172126	A/G			
rs6565219	95195	31172145	C/T			
rs889548	96822	31173772	A/G	0.54	0.51	0.320
rs6145813	Not mapped	Not mapped	/TTTTTT TTTTTT	0.33	0.32	0.909

[0233] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 1A for the discovery cohort. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 1C can be determined by consulting Table 13. For example, the left-most X on the left graph is at position 31077197. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0234] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The generally bottom-most curve is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0235] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken

horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is placed at the 3' end of each gene to show the direction of transcription.

Example 5

Chromosome 4 Region Proximal SNPs

[0236] SNP rs1957723 is associated with osteoarthritis and is described in Table A. SNP rs1957723 falls in an intergenic region on chromosome 4 that does not include a known gene, therefore, the region is referred to herein as the *Chrom 4* region. One hundred-thirty additional allelic variants proximal to rs1957723 were identified and subsequently allelotyped in osteoarthritis case and control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 14. The chromosome positions provided in column four of Table 14 are based on Genome "Build 34" of NCBI's GenBank.

TABLE 14

dbSNP rs#	Chromosome	Position in SEQ ID NO: 2	Chromosome Position	Allele Variants
rs3849023	4	211	36870611	g/t
rs1444311	4	7217	36877617	a/g
rs2044295	4	7895	36878295	a/c
rs2166093	4	13308	36883708	c/t
rs2376334	4	14279	36884679	g/t
rs1444320	4	17026	36887426	c/t
rs2044294	4	18271	36888671	a/g
rs1899864	4	20417	36890817	c/t
rs1562094	4	21843	36892243	a/g
rs1562098	4	22069	36892469	a/g
rs1562097	4	22145	36892545	a/g
rs1562096	4	22519	36892919	a/g
rs1562095	4	22539	36892939	a/g
rs1444319	4	23236	36893636	a/c
rs1444318	4	23256	36893656	a/c
rs1025938	4	23402	36893802	c/t
rs1025937	4	23499	36893899	a/c
rs1025936	4	23620	36894020	c/t
rs1020333	4	23871	36894271	a/t
rs2120654	4	24136	36894536	c/g
rs2588547	4	25427	36895827	a/g
rs2044293	4	25866	36896266	g/t
rs2760324	4	26541	36896941	a/g
rs2588546	4	26576	36896976	g/t
rs2588545	4	26689	36897089	a/g
rs2760328	4	26720	36897120	a/c
rs2588544	4	27113	36897513	c/t
rs2760331	4	27164	36897564	c/t
rs2588543	4	27186	36897586	a/g
rs2588542	4	28341	36898741	a/t
rs2588541	4	29160	36899560	c/t
rs2588540	4	29844	36900244	a/g

dbSNP rs#	Chromosome	Position in SEQ ID NO: 2	Chromosome Position	Allele Variants
rs2760336	4	30665	36901065	g/t
rs2760337	4	30830	36901230	a/g
rs2028732	4	31061	36901461	a/c
rs2588538	4	31523	36901923	c/t
rs1992617	4	32326	36902726	c/t
rs1998469	4	32346	36902746	a/g
rs1998470	4	32358	36902758	c/t
rs1975498	4	34909	36905309	c/t
rs1562093	4	34975	36905375	a/g
rs1975497	4	35066	36905466	c/t
rs1562092	4	35096	36905496	g/t
rs2248788	4	35375	36905775	c/t
rs1899862	4	36304	36906704	a/g
rs2588532	4	36712	36907112	a/t
rs1885878	4	36770	36907170	c/t
rs986648	4	37342	36907742	c/t
rs986647	4	37412	36907812	c/t
rs1010010	4	37884	36908284	a/g
rs1010009	4	38077	36908477	a/c
rs2760325	4	38300	36908700	c/t
rs2588531	4	38301	36908701	c/t
rs1838388	4	41189	36911589	c/t
rs1975495	4	44408	36914808	c/t
rs2181491	4	44493	36914893	a/c
rs1975496	4	44571	36914971	a/g
rs2181492	4	44670	36915070	a/g
rs2224719	4	45219	36915619	a/g
rs2224720	4	45258	36915658	c/t
rs1951770	4	47261	36917661	a/g
rs2296040	4	48473	36918873	a/c
rs1957723	4	48771	36919171	a/g
rs1957725	4	55292	36925692	c/t
rs2889346	4	56479	36926879	a/g
rs1885879	4	56747	36927147	a/c
rs1957726	4	60620	36931020	g/t
rs1957727	4	60688	36931088	a/c
rs1885880	4	61058	36931458	a/c
rs1885881	4	61129	36931529	c/t
rs942108	4	61577	36931977	c/t
rs1951771	4	61961	36932361	a/g
rs2376323	4	63351	36933751	g/t
rs2013358	4	63926	36934326	a/g
rs2181494	4	65798	36936198	a/g
rs1957728	4	66043	36936443	a/c
rs1957729	4	66044	36936444	a/g
rs1957730	4	66246	36936646	c/t
rs1957731	4	66318	36936718	c/t
rs1998468	4	66547	36936947	g/t
rs1957732	4	71238	36941638	c/t
rs1957733	4	71283	36941683	a/g
rs2376322	4	71492	36941892	a/g
rs2889345	4	72274	36942674	a/g

dbSNP rs#	Chromosome	Position in SEQ ID NO: 2	Chromosome Position	Allele Variants
rs1815267	4	73762	36944162	a/t
rs1957734	4	74209	36944609	g/t
rs1957735	4	75284	36945684	a/t
rs1957736	4	77347	36947747	a/c
rs1957737	4	77589	36947989	c/t
rs1957738	4	78096	36948496	a/g
rs1957739	4	78606	36949006	a/g
rs1957740	4	78862	36949262	g/t
rs1957741	4	79135	36949535	a/g
rs1957742	4	79146	36949546	a/g
rs1957743	4	79456	36949856	c/t
rs1957744	4	79609	36950009	a/g
rs1957745	4	80086	36950486	a/g
rs1957746	4	80119	36950519	a/g
rs1957747	4	80766	36951166	c/t
rs2146670	4	81110	36951510	a/g
rs2146671	4	81269	36951669	a/t
rs1957748	4	81668	36952068	c/t
rs2162307	4	82433	36952833	c/t
rs1962839	4	82559	36952959	c/g
rs2376315	4	83298	36953698	c/t
rs1426410	4	83821	36954221	a/g
rs1895921	4	84121	36954521	c/t
rs1895922	4	84147	36954547	c/t
rs1035779	4	84543	36954943	a/g
rs1035780	4	84554	36954954	a/g
rs1035781	4	84691	36955091	a/g
rs1035782	4	84727	36955127	a/g
rs1426411	4	85678	36956078	c/t
rs1834602	4	86699	36957099	c/t
rs1834603	4	86700	36957100	a/g
rs1834604	4	86792	36957192	a/g
rs1834605	4	86832	36957232	a/g
rs2162308	4	87045	36957445	a/g
rs1365341	4	87140	36957540	a/g
rs1820458	4	87365	36957765	a/c
rs1469310	4	88342	36958742	c/t
rs3057879	4	88498	36958898	-/tca
rs1469311	4	88589	36958989	a/g
rs768326	4	95502	36965902	a/g
rs1863523	4	96968	36967368	c/t
rs1469312	4	97448	36967848	c/t
rs1469313	4	97568	36967968	c/t
rs1951773	4	98724	36969124	c/t
rs2120655	4	Not mapped	Not mapped	t/g
rs2181495	4	Not mapped	Not mapped	g/a

Assay for Verifying and Allelotyping SNPs

[0237] The methods used to verify and allelotype the 130 proximal SNPs of Table 14 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 15 and Table 16, respectively.

TABLE 15

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs3849023	ACGTTGGATGGGTAATTGCTAACCATGTTC	ACGTTGGATGGACCCAGTCAAGTCAATAAAC
rs1444311	ACGTTGGATGGCCTATTGGTTTAACTAGGC	ACGTTGGATGTCTGGCTTCTTCAGGAGTTC
rs2044295	ACGTTGGATGCCACACCACTACTATTCAAG	ACGTTGGATGGTGGTGTGTTAGAAAGGTTAC
rs2166093	ACGTTGGATGAAAATCCTGGAGATGGATGG	ACGTTGGATGTAGGTGTACAGTTCAGTGTC
rs2376334	ACGTTGGATGTCTCAGAGAACCAGCTTTTG	ACGTTGGATGGGGAATATTAAACATTGGGG
rs1444320	ACGTTGGATGTAATTCTCTCCTCCAAATGC	ACGTTGGATGCTAGAAACAAAAGACTACATG
rs2044294	ACGTTGGATGAACCTAAATCTCCTCAAGCC	ACGTTGGATGTTCTGACCACTTCTCTATGG
rs1899864	ACGTTGGATGTTTATAGGCGTGGGCAATCG	ACGTTGGATGTTGTGAGAAAGTGTCTGTGCC
rs1562094	ACGTTGGATGTGGATTCTTTCTTGAAGAC	ACGTTGGATGGCAACAAAGAACTTAATGC
rs1562098	ACGTTGGATGTCTGAGTCCGAGTGATCATC	ACGTTGGATGAAACAATTAGCAGGGGCACAG
rs1562097	ACGTTGGATGCACAGGATCTTACTCTGTTG	ACGTTGGATGCGGACTCAGAAATTCAAGTC
rs1562096	ACGTTGGATGACCCAGGGCATGTTATATAG	ACGTTGGATGTTTCTCTCTGGTACCCTCTC
rs1562095	ACGTTGGATGTGTTAGTAACCCAGGGCATG	ACGTTGGATGTGACAGATGCCACCAGTTAC
rs1444319	ACGTTGGATGTTCAACTTTAGCCTCTGGGC	ACGTTGGATGCCCTGCAAAGTCAAAGGAAC
rs1444318	ACGTTGGATGCTCTGGGCAATTATCAAGCC	ACGTTGGATGAGTTCGCTGATGTGTTTGGG
rs1025938	ACGTTGGATGCAGGTAAGAAAAGCTTTTTGG	ACGTTGGATGCCCTGCTAATGACTGAATTTT
rs1025937	ACGTTGGATGGAATAGGAAAGGTAGTATACC	ACGTTGGATGAAATTCAGTCATTAGCAGGG
rs1025936	ACGTTGGATGTCTCCAGGTAGATGAGTCAG	ACGTTGGATGCCACACACCAAAGCAATCAC
rs1020333	ACGTTGGATGGCATCTCTTCAATCTGGACG	ACGTTGGATGGTGGATCACAGAAGTCAGAG
rs2120654	ACGTTGGATGACCAGAAAGACCAGGGCATG	ACGTTGGATGAACCTTTAGCTCTTCTCCCC
rs2588547	ACGTTGGATGTCACAAATGTAATATAAATC	ACGTTGGATGGATAGCTACGTTTAAAAATG
rs2044293	ACGTTGGATGTGTCAACAATACAAGACTAA	ACGTTGGATGTGCACTGGACTTTTTTTTTT
rs2760324	ACGTTGGATGACAAACCAGTGGTTGAGGAG	ACGTTGGATGCCTCACGAATCCAACAGAAC
rs2588546	ACGTTGGATGCTTAGAGGATGGAGTCAGTC	ACGTTGGATGTACTACCAGAGATGCTGGTG
rs2588545	ACGTTGGATGCAACACAGCTACAGTGCATC	ACGTTGGATGTGGGTAAAGGGAAAAGAAGG
rs2760328	ACGTTGGATGGCCATAAAATTGGGTAAAGGG	ACGTTGGATGGCATCTATTTGACACCAACG
rs2588544	ACGTTGGATGTAAGAATTAGCATGTGAAAG	ACGTTGGATGTTTGTGCACAAAGAATTTGG
rs2760331	ACGTTGGATGAAACAGTATGCCTTTTGTGC	ACGTTGGATGCTTCTCGTAATTTTACATGAC
rs2588543	ACGTTGGATGGTGCCAAATTCTTTGTGCAC	ACGTTGGATGCTAAGATAGGTAGATACCAG
rs2588542	ACGTTGGATGTGGCAGCAAAGCTTAAGCTC	ACGTTGGATGTCCACAGTCACCTCTCATTC
rs2588541	ACGTTGGATGTGACAAGGTCTATGTCAGGG	ACGTTGGATGGGCATTGTCATGGTGATGAG
rs2588540	ACGTTGGATGTGCTGTATGATCCAGCAATC	ACGTTGGATGGGTGCAAATACTGTCTCTTC
rs2760336	ACGTTGGATGAAGCTGAGGCAGGAGAATGG	ACGTTGGATGTGTTTTGAGACGGAGTCTCG
rs2760337	ACGTTGGATGGGTGTTTGAAGTATACAAG	ACGTTGGATGACTACCATTTCTACTCTCTGC
rs2028732	ACGTTGGATGTTCTTGACAGCTAAATAGG	ACGTTGGATGGCCATTGTGCTTTTCTTGTT
rs2588538	ACGTTGGATGTATCTTCTGGGAAGCCTTTC	ACGTTGGATGGACTTGAAATCACTCCATGC
rs1992617	ACGTTGGATGGGAGGACATTGCCTTCAAAG	ACGTTGGATGCTGACCTTCTGTCTAGTCAC
rs1998469	ACGTTGGATGTATATGCCAAGGACCAACGG	ACGTTGGATGCTGACCTTCTGTCTAGTCAC
rs1998470	ACGTTGGATGATTTCCCCCATTAAGCTTTG	ACGTTGGATGGAAAAGTATTATATGCCAAGG
rs1975498	ACGTTGGATGAGCTCTCTTTTGCCTGCTG	ACGTTGGATGAGGAGGCTTCACAATCATGG
rs1562093	ACGTTGGATGTGATTGTGAAGCCTCCTCTG	ACGTTGGATGAAAGACATACCCAAGACTGG
rs1975497	ACGTTGGATGTCAGCAGCATGAAAAGTAC	ACGTTGGATGCATTTAGACTTTTTCTGGGG
rs1562092	ACGTTGGATGTTCCAGTGACTGGACCATAG	ACGTTGGATGTCAGCAGCATGAAAAGTAC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs2248788	ACGTTGGATGGGGAAAAGAAAAAGACTTCC	ACGTTGGATGGTAGTAGCTGCTTCTAAAAG
rs1899862	ACGTTGGATGTAATCTCCCATAATAAGTGC	ACGTTGGATGGCTACAAAAGAAAATGAATAC
rs2588532	ACGTTGGATGCAAACAATAGTGGCTGAGAG	ACGTTGGATGTTTGTAGCACAGGCGCATAG
rs1885878	ACGTTGGATGTGACTCAGCGAGTTTGTAGC	ACGTTGGATGAGCCAGATTGGGTGCTTTTC
rs986648	ACGTTGGATGTGAGAAAGCTTTCTGAGGAC	ACGTTGGATGGGTTTTCTGTTGTGAATGGG
rs986647	ACGTTGGATGACACACTCTTTCTCAAGCAG	ACGTTGGATGCTTATTTGTCCTCAGAAAGC
rs1010010	ACGTTGGATGACTGTAGCTAAGTTGGCAT	ACGTTGGATGTTACCAACACCAATAAGGC
rs1010009	ACGTTGGATGTCTCATCAGCTCTTTCCTGG	ACGTTGGATGAAAGGGATGAGGAAGTGAGG
rs2760325	ACGTTGGATGATCCCCAGCATGTAGCATAG	ACGTTGGATGCTGCCCATAAGTCTCTTCTG
rs2588531	ACGTTGGATGATCCCCAGCATGTAGCATAG	ACGTTGGATGCTGCCCATAAGTCTCTTCTG
rs1838388	ACGTTGGATGGTACCTCATGGATATTTACAC	ACGTTGGATGTTGGTGTGTTATAAATGAC
rs1975495	ACGTTGGATGCAGGTCAGGAGTTTAAGACC	ACGTTGGATGAGCTGGGATTACAGTCATGC
rs2181491	ACGTTGGATGGTACCTAATATATGCTTCTGG	ACGTTGGATGTTATTCCCGTCTTACTTTCC
rs1975496	ACGTTGGATGTATATTAGGTACAGTGTGGC	ACGTTGGATGCAACCAACTTCACTGAAAGC
rs2181492	ACGTTGGATGCTTGCAGGAAGAGGAAGAAG	ACGTTGGATGACAATCACCTTTGGAGGCAG
rs2224719	ACGTTGGATGTCAAGGGTGTAGATGTGTAG	ACGTTGGATGCCAGAGAGGAGTAATGGTAT
rs2224720	ACGTTGGATGCCAATTACTCAAGGGTGTAG	ACGTTGGATGAATTCAGTACAGACAGAGGG
rs1951770	ACGTTGGATGCCTGGGAACCTTCAGCTTTTC	ACGTTGGATGTGGCACAGCAGGAATATCAG
rs2296040	ACGTTGGATGGGGCATCATGAAATGCAGAC	ACGTTGGATGGCATGTACAGGAAAGCAGTG
rs1957723	ACGTTGGATGTACTCACTTGTGTACTGCTC	ACGTTGGATGGCTGCAGCGTCACATTAATC
rs1957725	ACGTTGGATGTTATTGGAATTCTCCAGGTC	ACGTTGGATGAAGATGATTAGTCCAGCCTG
rs2889346	ACGTTGGATGTGACTGACTTCCTAGGTCAG	ACGTTGGATGTGACAGTGTTTGAGTGGCAG
rs1885879	ACGTTGGATGTTCACCCCTTCACATCTGAT	ACGTTGGATGCTACAAGGAAGATAACAGAG
rs1957726	ACGTTGGATGAAATTCAGCCACTCAACCAG	ACGTTGGATGAAGTGGTTGGGATTTGTGAG
rs1957727	ACGTTGGATGGCCAACGTATCTTTAAAACCC	ACGTTGGATGGTTTTGTCTTGGTTCTCATC
rs1885880	ACGTTGGATGTGGAATGCCCAAGATTTCA	ACGTTGGATGCTGGAATCCCAAGGTTCCCTG
rs1885881	ACGTTGGATGTAGACGTGTTCTGCATCATG	ACGTTGGATGATGAAATCTTGGGGCATTCC
rs942108	ACGTTGGATGGAGCTGTTAGGGTAGAAATG	ACGTTGGATGGTCCTTGGACTAATTTTGACC
rs1951771	ACGTTGGATGGGCATTCCCTTTTGTCTAAG	ACGTTGGATGAGTAAACAAGGACTAGAGCC
rs2376323	ACGTTGGATGTCCTTACTTGCTAGCACTGC	ACGTTGGATGGCATCCCTTGGTGA CTGATA
rs2013358	ACGTTGGATGGGAATTTTAGGAGTACTGTAG	ACGTTGGATGGCCAACCATAGAACCTAAATC
rs2181494	ACGTTGGATGATTCAATTACCTCCCACTGG	ACGTTGGATGTATCCCCACCCAAATGTCAC
rs1957728	ACGTTGGATGAAATAGATCCCAACCAAGGG	ACGTTGGATGGTAACATTTACCTAAGCGGG
rs1957729	ACGTTGGATGAAATAGATCCCAACCAAGGG	ACGTTGGATGGTAACATTTACCTAAGCGGG
rs1957730	ACGTTGGATGGGTCTAAACATGAGAGACTC	ACGTTGGATGTCTTTATGGATATAGGGTCC
rs1957731	ACGTTGGATGTATTGGAACCTGGTACCTGG	ACGTTGGATGGACCTGAATCATGTCTCCAG
rs1998468	ACGTTGGATGTATAAAGCCTCAAAAGTGGG	ACGTTGGATGACCTTATTCCAGAATGAAAC
rs1957732	ACGTTGGATGAAGAGAGGAGTTTATTGGCC	ACGTTGGATGCGGCCTGATCTTTATTTTCG
rs1957733	ACGTTGGATGCTATCAAGACTCTGATTGCC	ACGTTGGATGTGTTTGCAGGTAAACTTGGC
rs2376322	ACGTTGGATGTCGTTCTCTCTGTGCATG	ACGTTGGATGTTAGTCAGATGCTTGGTGAG
rs2889345	ACGTTGGATGTGGAATCCCAACCTTTCAG	ACGTTGGATGTTCTTGCTAAATGTAGGCC
rs1815267	ACGTTGGATGCAGGAAAGGGCTACTATCAG	ACGTTGGATGGTAGGCCAAACTAGCTTTGG
rs1957734	ACGTTGGATGCTACCCCTGCCTTATAATTC	ACGTTGGATGCAAGTGGTAAAAGGATGTGG
rs1957735	ACGTTGGATGAGCTTCCCATGGTTATAGAG	ACGTTGGATGCTGAAAACAATACCGGTCTC
rs1957736	ACGTTGGATGCTGAAGCAAAGATTTCTCTC	ACGTTGGATGAGCATCTTTTGCTGTCACTG
rs1957737	ACGTTGGATGACATGGAAGCTGAAGCCAAG	ACGTTGGATGCAGAGCTTTGACCTTACTCC
rs1957738	ACGTTGGATGATGTCCCTTAAAGGCTGCC	ACGTTGGATGCAGATGATCTTGCTTCCAG
rs1957739	ACGTTGGATGTCACTGCCTGAGTGCTTTAG	ACGTTGGATGCTGATGGCCTGAGAACTAAG
rs1957740	ACGTTGGATGGCCCAGTCAAGTTGACATAC	ACGTTGGATGCACCTGCTCCAGTTATATAC
rs1957741	ACGTTGGATGAGGAGCATTATCCCTATTAG	ACGTTGGATGCCTCTTAGTAAAATATGGATG
rs1957742	ACGTTGGATGGGATGATATCTACTTTGTACG	ACGTTGGATGGACTCCATCTGAGATGTTAG
rs1957743	ACGTTGGATGCAACTGTCTTGTATTTGAAG	ACGTTGGATGGACAGACTTTCATTGTTTTTC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs1957744	ACGTTGGATGTCAGTGTACCCTGTAATGCC	ACGTTGGATGTGCCCAGCAGTGAGTAATTG
rs1957745	ACGTTGGATGGTTTAGAAAGTGTTGGGTTCC	ACGTTGGATGAGCAAATGCAGCTTATTACC
rs1957746	ACGTTGGATGTCTCATACAACATAGTTAGC	ACGTTGGATGGGTTTAGGTTTGGTTTGATG
rs1957747	ACGTTGGATGGTCACTCAAGATAACAGTTCC	ACGTTGGATGTTACCTAACGTGAAGGTAGC
rs2146670	ACGTTGGATGCCTAACACATCTTTATGAGC	ACGTTGGATGCTCATAAGATATGCTAAGCAC
rs2146671	ACGTTGGATGATGAGGAGCAACTAGAAGGC	ACGTTGGATGAAAGGGCTGGAAGAAACAGG
rs1957748	ACGTTGGATGTGAAGTTTGTAGTAGGGAGC	ACGTTGGATGTTCTGTACACAAACACTCC
rs2162307	ACGTTGGATGACATGCGGTGCCTGGCCCTTT	ACGTTGGATGCCTTTGTAGGGACATGGATG
rs1962839	ACGTTGGATGGGCTGCATAGTATTCCATGG	ACGTTGGATGAGGGAATCCTTTCCCCATTG
rs2376315	ACGTTGGATGTGGCCTTGGATTTCTTCCAC	ACGTTGGATGAGAATTGGACAGAGTGGCAG
rs1426410	ACGTTGGATGGAGAAAGTTGCATCTTGCCC	ACGTTGGATGGGGAAGTTTACCTTGGCTC
rs1895921	ACGTTGGATGGGTGATGGTGTGTTGAGGTAC	ACGTTGGATGATTAGGCTTCTCCCACCATC
rs1895922	ACGTTGGATGCAATGCATTAGGCTTCTCCC	ACGTTGGATGGAGGTACATTTCTCAGGCAG
rs1035779	ACGTTGGATGGAGAATCACTTGAACCCGGG	ACGTTGGATGTGGAGTGCAGTGGCATGATC
rs1035780	ACGTTGGATGTTTGAGATGGAGTCTCGCTC	ACGTTGGATGAATCACTTGAACCCGGGAGG
rs1035781	ACGTTGGATGGGAAGATGCTGACTCTGAAC	ACGTTGGATGCCTTGACTGTTTAGGGATCC
rs1035782	ACGTTGGATGGGATCCCTAAACAGTCAAGG	ACGTTGGATGAGTTGGCTAGACTTGCGTTC
rs1426411	ACGTTGGATGCAAGAGTGCTACACAAGTCG	ACGTTGGATGTGTACCTTGGTCAGGTGATC
rs1834602	ACGTTGGATGGATGGGCCCTATTTTTCTTG	ACGTTGGATGCTTTTCCAACCCAGTAATGTC
rs1834603	ACGTTGGATGGATGGGCCCTATTTTTCTTG	ACGTTGGATGTCTTTTCCAACCCAGTAATG
rs1834604	ACGTTGGATGGAAAGACATTACTGGGTTGG	ACGTTGGATGAGAATTCTTCCTGACTGTGG
rs1834605	ACGTTGGATGGCCACAGTCAGGAAGAATT	ACGTTGGATGTTGTGGAGACTGGCCAAAAG
rs2162308	ACGTTGGATGTAAAGAAACAGAGGGACACC	ACGTTGGATGTATGATCAGAGTCATCAGGG
rs1365341	ACGTTGGATGTCCCTCTGTTTCTTTAGGCA	ACGTTGGATGCATCTCCCCTGGTAGCATTT
rs1820458	ACGTTGGATGCACCCTCAGACTTGGAATG	ACGTTGGATGGTCAGGTGACTCTATTCAGC
rs1469310	ACGTTGGATGTACTACAGCGTGTTTAGCAG	ACGTTGGATGTGTCAAAGGGAGAGTTAGAG
rs3057879	ACGTTGGATGGGCACATTGGAAAATAAAGCC	ACGTTGGATGACGGCATGAACAATTCTCAG
rs1469311	ACGTTGGATGCCTGAGAATTGTTTCATGCCG	ACGTTGGATGTTTTCAGTGTTCTCTCCAGG
rs768326	ACGTTGGATGAATTAGCCAGGCATGGTGTG	ACGTTGGATGACATCCTAGGCTCAAGTGAC
rs1863523	ACGTTGGATGGGCAGACACATTCCTATTG	ACGTTGGATGGGGAAAGGTGTGCTGAGTAA
rs1469312	ACGTTGGATGCATTTGCTCAGCATTCTAGC	ACGTTGGATGGGACTCATGTCATCTCTTGG
rs1469313	ACGTTGGATGAGTGAGGGAGAAAAGTGAAC	ACGTTGGATGCCTAACTTCTCTCCAATCTC
rs1951773	ACGTTGGATGAAGGTTCAAGTTACCGCATG	ACGTTGGATGCACTGTGGTCCATGAAAAA
rs2120655	ACGTTGGATGACAGGGTTTCTGCATGTTGC	ACGTTGGATGACGCCTGTAATCCCAGCACT
rs2181495	ACGTTGGATGGAATTGTGGGAGTTACAATTC	ACGTTGGATGGAATCAAGCTAATTAACATGTG

TABLE 16

dbSNP rs#	Extend Primer	Term Mix
rs3849023	CTCATAACATAAGAAGTTGATGC	CGT
rs1444311	CTAGGCATGCTAGCTTGGC	ACT
rs2044295	CACTACTATTCAAGATTACCCTTT	ACT
rs2166093	GGTGGTGATGGCTGCACAA	ACG
rs2376334	TCAGAGAACCAGCTTTTGATTTC	ACT
rs1444320	GCCTAGACCCCGTGCAAC	ACG
rs2044294	CTCCTCAAGCCAATAGGTCTTA	ACG
rs1899864	CGCACCTGGCCGAAAATAAC	ACT
rs1562094	AACCTGCAAAAGATTTACACTTGC	ACT
rs1562098	TCCTGCCTCAGCCTTCCTAGA	ACT

dbSNP rs#	Extend Primer	Term Mix
rs1562097	ACTCTGTTGTTTCAGGCTGGGGT	ACT
rs1562096	TAAGCTAGCTAGTAACTGGTG	ACT
rs1562095	ATGTTATATAGAACATCCCTTTTT	ACT
rs1444319	TCTGGGCAATTATCAAGCCTTT	ACT
rs1444318	CTTTGCATTTTCCTGAGTTCCTTT	ACT
rs1025938	AAGAAAAGCTTTTTGGTTTGGG	ACT
rs1025937	GGTAGTATACCTAAAAAACAGC	CGT
rs1025936	TCAAAGGACACCCAGCATTCA	ACG
rs1020333	ACGTTTATCTGTAACCTTTCCA	CGT
rs2120654	GAAAGACCAGGGCATGATTAGA	ACT
rs2588547	ACAAATGTAATATAAATCAAGCTC	ACG
rs2044293	ACCAGCCTGGGTAACATAGCCA	ACT
rs2760324	GGTTGAGGAGAAGCACCAAGCA	ACG
rs2588546	TACAATTTCTAGCCTTAATAAGAT	ACT
rs2588545	TACAGTGCATCTATTTGACACCAA	ACG
rs2760328	AAATTGGGTAAAGGGAAAAGAAG	ACT
rs2588544	ATTAGCATGTGAAAGACTTCTC	ACT
rs2760331	AGTATGCCTTTTGTGCACAAAGA	ACT
rs2588543	ATTCTTTGTGCACAAAAGGCATA	ACG
rs2588542	GCTTAAGCTCTTACAGGCAG	CGT
rs2588541	AGGTCTATGTCAGGGAAAACCTTA	ACG
rs2588540	GATCCAGCAATCCCACTGAT	ACG
rs2760336	AGGCGGAGCTTGCAGTGAG	ACT
rs2760337	CACCAATACTGTATGATTCTTTT	ACT
rs2028732	CAGCTAAATAGGGCTTGAGTCAAT	CGT
rs2588538	AATTTGTACAAATTTATGGGGTAT	ACT
rs1992617	ATTGCCTTCAAAGAACATCAAAGC	ACG
rs1998469	GACCAACGGGAGGACATTG	ACG
rs1998470	CTTTGAAGGCAATGTCCTCC	ACG
rs1975498	TTTTGCCTGCTGCTATCCAC	ACT
rs1562093	CTCCTCTGCCATGTGGAAC	ACG
rs1975497	AAACTGACTAATACACACTGTT	ACT
rs1562092	TTTGGTTAATGGACATTTAGACT	ACT
rs2248788	TGTGGGATTTTATTATTTTCATCA	ACT
rs1899862	TAAGTGCATAACTTGTCTTTGAGG	ACT
rs2588532	ATAGTGGCTGAGAGCCAGAT	CGT
rs1885878	GCGAGTTTGTAGCACAGGC	ACT
rs986648	GTACATGTAATGCTAGTAAAGAAA	ACG
rs986647	CTCTTTCTCAAGCAGGAGTTA	ACG
rs1010010	AGCTAAGTTGGCATGTGGGA	ACT
rs1010009	CCTGGCTACCTTCCAAAAAG	ACT
rs2760325	TCTCAGGAAGTATGAAATAAATAG	ACG
rs2588531	CTCAGGAAGTATGAAATAAATAGT	ACT
rs1838388	TCATGGATATTTACACCTACTAC	ACT
rs1975495	AGGAGTTTAAGACCAGCCTG	ACT
rs2181491	TGCTTCTGGATTTTAAATGATCAC	ACT
rs1975496	ATGATCAAATCATTTTGAGGGC	ACT
rs2181492	GTTGCATTGCTATGGTCTGC	ACT
rs2224719	CATATATCCCTCTGTCTGTAC	ACG

dbSNP rs#	Extend Primer	Term Mix
rs2224720	GGGTGTAGATGTGTAGATTTATA	ACT
rs1951770	ACAAGCATTAGAGACTTGATTG	ACG
rs2296040	CTTTGTTTCTAAAATCTGATAGTC	ACT
rs1957723	AGCATGGCATAGGCACTGG	ACG
rs1957725	GCGAGGAAAGACCTGTTCTA	ACG
rs2889346	GGTCAGCTCAGCTGGTTTTT	ACG
rs1885879	CACATCTGATGCTCTCCTAAA	ACT
rs1957726	GCCACTCAACCAGTAGGAAA	ACT
rs1957727	GTATCTTTAAAACCCCTCACAAAT	CGT
rs1885880	TTACGTTAGTCTGCCTACTTCCA	ACT
rs1885881	TGGGCTATCAATGATGGAAAC	ACT
rs942108	AAATGAAATAGAATTGTGTACTTC	ACT
rs1951771	TCCCTTTTGTCTAAGAATATTAG	ACG
rs2376323	CTAGCACTGCCAAGTGCAAC	ACT
rs2013358	TTTtaggagTactGTAGAACAca	ACG
rs2181494	TGGGTCCCTCCCATAACAC	ACT
rs1957728	AGAAGCATGTGCTTATAACAATAA	CGT
rs1957729	GAAGCATGTGCTTATAACAATAAA	ACT
rs1957730	ACATGAGAGACTCTGAAGACT	ACT
rs1957731	GGGTGAGCTTTGGGATCAC	ACT
rs1998468	GGGCATAATTAATCCATGTTAG	ACT
rs1957732	GGCCAAGTTTACCTGCAAAC	ACT
rs1957733	TCTAATGTTAAAGAGAGGAGTTTA	ACG
rs2376322	GCGCCAAGGAAAGGCCAC	ACT
rs2889345	TCATTTCTCACCCCTTGATATCCA	ACT
rs1815267	AAAGGGCTACTATCAGTTTTGT	CGT
rs1957734	CTGCCTTATAATTCTAAAAAGGT	ACT
rs1957735	CTAAACTAAGAAATGTTTCCAC	CGT
rs1957736	TAATACTAAGGAGAGGGCTCCT	ACT
rs1957737	AGCCAAGGGTGTGGATGAG	ACT
rs1957738	CCTTAAAAGGCTGCCTACAAAATA	ACT
rs1957739	CTGAGTGCTTTAGCTGGATTA	ACG
rs1957740	TTAAGCATCACACTGAGTTTGAG	ACT
rs1957741	AGCTGAATTAAGCGCGACAGCTA	ACG
rs1957742	TCTACTTTGTACGTAGCTGTCGC	ACT
rs1957743	GAAAATATTACTAAAAAAGACCTC	ACG
rs1957744	TGTACCCTGTAATGCCTAAAGC	ACG
rs1957745	TTTTCAAAGGTTTAGGTTTGTTTT	ACT
rs1957746	ACAACATAGTTAGCAAATGCAG	ACG
rs1957747	GATAACAGTTCCAATTACAACAA	ACG
rs2146670	ATCTTTATGAGCTTTTCTTTCTT	ACG
rs2146671	TACAACCCTTTCAGGACTTCA	CGT
rs1957748	TTGTAGTAGGGAGCCATGGT	ACT
rs2162307	CCTGGCCCTTTGTCCCTG	ACG
rs1962839	CCACATCTTTGACAAACCTGA	ACT
rs2376315	CCCCCTTCCTTTTCCAGGC	ACT
rs1426410	CATCTTGCCCTAAAATCACTC	ACG
rs1895921	GTACATTTCTCAGGCAGCTC	ACG
rs1895922	ATTAGGCTTCTCCCACCATC	ACT

dbSNP rs#	Extend Primer	Term Mix
rs1035779	ACCCGGGAGGGTTGCAGT	ACT
rs1035780	GGCTGGAGTGCAGTGGCA	ACG
rs1035781	ACCTAGACTAAGAGAGTGATTGCA	ACT
rs1035782	CCTAAACAGTCAAGGCAAAGG	ACT
rs1426411	TTTATGGTCTTCTTAGGATATCA	ACG
rs1834602	AGGAAGGTGCCCAGATCCT	ACG
rs1834603	AGGAAGGTGCCCAGATCCTT	ACT
rs1834604	AGTTTTCTAGTAACCTTCTCTAAAA	ACT
rs1834605	ACAGTCAGGAAGAATTCTGTCT	ACT
rs2162308	CACCTACAGAGTTTAAGTAAATTT	ACG
rs1365341	AAATCTCCTGGAGGGCTTCATAA	ACT
rs1820458	TGGAAATGGCAACTGAATCCT	ACT
rs1469310	ACCCACACAATGCCAATAGCAC	ACT
rs3057879	TGGAAAATAAAGCCTTTTGAGGTT	ACT
rs1469311	TGCCGTTAAAGAGGAAAAGCT	ACT
rs768326	CAGCTACTCTGTAAAGCTGAA	ACT
rs1863523	ATATTCTTGCTCATCTTTCTCTAT	ACT
rs1469312	TAGTCCAGCAAACGCCAGC	ACT
rs1469313	GTGAACAAATAATGCAAGTTCAG	ACT
rs1951773	CCCTTTGGGAGAGAAGGGC	ACT
rs2120655	AGCAATCCTCCCACTTTGGC	CGT
rs2181495	GGTGACATTTGGGTGGGGATACA	ACT

Genetic Analysis

[0238] Allelotyping results from the discovery cohort are shown for cases and controls in Table 17. The allele frequency for the A2 allele is noted in the fifth and sixth columns for osteoarthritis case pools and control pools, respectively, where “AF” is allele frequency. The allele frequency for the A1 allele can be easily calculated by subtracting the A2 allele frequency from 1 (A1 AF = 1-A2 AF). For example, the SNP rs1444311 has the following case and control allele frequencies: case A1 (A) = 0.74; case A2 (G) = 0.26; control A1 (A) = 0.75; and control A2 (G) = 0.25, where the nucleotide is provided in paranthesis. Some SNPs are labeled “untyped” because of failed assays.

TABLE 17

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs3849023	211	36870611	G/T			
rs1444311	7217	36877617	A/G	0.26	0.25	0.566
rs2044295	7895	36878295	A/C			
rs2166093	13308	36883708	C/T			
rs2376334	14279	36884679	G/T	0.15	0.16	0.734
rs1444320	17026	36887426	C/T			
rs2044294	18271	36888671	A/G	0.16	0.14	0.412
rs1899864	20417	36890817	C/T			
rs1562094	21843	36892243	A/G	0.22	0.23	0.586
rs1562098	22069	36892469	A/G			
rs1562097	22145	36892545	A/G	NA	0.97	NA
rs1562096	22519	36892919	A/G	0.20	0.21	0.773
rs1562095	22539	36892939	A/G	0.53	0.51	0.407
rs1444319	23236	36893636	A/C	0.74	0.79	0.023

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1444318	23256	36893656	A/C	0.12	0.13	0.559
rs1025938	23402	36893802	C/T	0.18	0.19	0.633
rs1025937	23499	36893899	A/C			
rs1025936	23620	36894020	C/T	0.84	0.84	0.907
rs1020333	23871	36894271	A/T			
rs2120654	24136	36894536	C/G	0.15	0.16	0.718
rs2588547	25427	36895827	A/G	0.39	0.40	0.603
rs2044293	25866	36896266	G/T			
rs2760324	26541	36896941	A/G	0.59	0.61	0.395
rs2588546	26576	36896976	G/T	0.07	0.05	0.352
rs2588545	26689	36897089	A/G			
rs2760328	26720	36897120	A/C	0.25	0.26	0.791
rs2588544	27113	36897513	C/T			
rs2760331	27164	36897564	C/T	0.91	0.94	0.184
rs2588543	27186	36897586	A/G	0.59	0.59	0.828
rs2588542	28341	36898741	A/T			
rs2588541	29160	36899560	C/T	0.61	0.59	0.313
rs2588540	29844	36900244	A/G	0.62	0.62	0.999
rs2760336	30665	36901065	G/T			
rs2760337	30830	36901230	A/G	0.16	0.16	0.826
rs2028732	31061	36901461	A/C	0.60	0.58	0.432
rs2588538	31523	36901923	C/T	0.62	0.61	0.853
rs1992617	32326	36902726	C/T	0.61	0.59	0.282
rs1998469	32346	36902746	A/G			
rs1998470	32358	36902758	C/T	0.81	0.86	0.018
rs1975498	34909	36905309	C/T			
rs1562093	34975	36905375	A/G	0.89	0.87	0.529
rs1975497	35066	36905466	C/T	0.13	0.13	0.691
rs1562092	35096	36905496	G/T			
rs2248788	35375	36905775	C/T	0.29	0.31	0.368
rs1899862	36304	36906704	A/G	0.18	0.16	0.274
rs2588532	36712	36907112	A/T	0.30	0.32	0.443
rs1885878	36770	36907170	C/T	0.35	0.35	0.866
rs986648	37342	36907742	C/T	0.74	0.73	0.679
rs986647	37412	36907812	C/T	0.78	0.76	0.263
rs1010010	37884	36908284	A/G	0.25	0.26	0.649
rs1010009	38077	36908477	A/C	0.26	0.25	0.781
rs2760325	38300	36908700	C/T			
rs2588531	38301	36908701	C/T			
rs1838388	41189	36911589	C/T	0.75	0.74	0.650
rs1975495	44408	36914808	C/T			
rs2181491	44493	36914893	A/C	0.14	0.12	0.235
rs1975496	44571	36914971	A/G	0.26	0.26	0.944
rs2181492	44670	36915070	A/G	0.11	0.09	0.311
rs2224719	45219	36915619	A/G	0.78	0.78	0.866
rs2224720	45258	36915658	C/T	0.20	0.21	0.641
rs1951770	47261	36917661	A/G	0.22	0.18	0.029
rs2296040	48473	36918873	A/C	0.41	0.43	0.459
rs1957723	48771	36919171	A/G	0.42	0.38	0.113
rs1957725	55292	36925692	C/T	0.75	0.78	0.196
rs2889346	56479	36926879	A/G	0.54	0.55	0.677
rs1885879	56747	36927147	A/C	0.44	0.48	0.123
rs1957726	60620	36931020	G/T	0.14	0.14	0.741
rs1957727	60688	36931088	A/C	0.73	0.76	0.271
rs1885880	61058	36931458	A/C	0.43	0.43	0.935
rs1885881	61129	36931529	C/T	0.12	0.11	0.681
rs942108	61577	36931977	C/T	0.49	0.52	0.317
rs1951771	61961	36932361	A/G	0.93	NA	NA
rs2376323	63351	36933751	G/T			
rs2013358	63926	36934326	A/G	0.13	0.13	0.821
rs2181494	65798	36936198	A/G	0.42	0.43	0.512
rs1957728	66043	36936443	A/C			
rs1957729	66044	36936444	A/G	0.79	0.77	0.405
rs1957730	66246	36936646	C/T	0.15	0.16	0.719

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1957731	66318	36936718	C/T	0.14	0.16	0.413
rs1998468	66547	36936947	G/T	0.13	0.12	0.468
rs1957732	71238	36941638	C/T	0.10	0.10	0.841
rs1957733	71283	36941683	A/G	0.63	0.61	0.632
rs2376322	71492	36941892	A/G	0.26	0.28	0.509
rs2889345	72274	36942674	A/G	0.20	0.18	0.234
rs1815267	73762	36944162	A/T	0.46	0.45	0.674
rs1957734	74209	36944609	G/T	0.55	0.64	0.003
rs1957735	75284	36945684	A/T	0.63	0.61	0.430
rs1957736	77347	36947747	A/C	0.05	0.05	0.903
rs1957737	77589	36947989	C/T	0.71	0.75	0.164
rs1957738	78096	36948496	A/G			
rs1957739	78606	36949006	A/G			
rs1957740	78862	36949262	G/T			
rs1957741	79135	36949535	A/G	0.76	0.80	0.077
rs1957742	79146	36949546	A/G	0.95	0.96	0.500
rs1957743	79456	36949856	C/T	0.21	0.16	0.039
rs1957744	79609	36950009	A/G	0.66	0.70	0.088
rs1957745	80086	36950486	A/G	0.88	0.90	0.354
rs1957746	80119	36950519	A/G	0.40	0.44	0.120
rs1957747	80766	36951166	C/T	0.72	0.76	0.093
rs2146670	81110	36951510	A/G	0.73	0.77	0.072
rs2146671	81269	36951669	A/T	0.17	0.15	0.250
rs1957748	81668	36952068	C/T	0.16	0.14	0.407
rs2162307	82433	36952833	C/T	0.73	0.76	0.170
rs1962839	82559	36952959	C/G			
rs2376315	83298	36953698	C/T	0.62	0.66	0.179
rs1426410	83821	36954221	A/G	0.75	0.77	0.307
rs1895921	84121	36954521	C/T	0.75	0.78	0.175
rs1895922	84147	36954547	C/T	0.15	0.12	0.095
rs1035779	84543	36954943	A/G	0.66	0.64	0.649
rs1035780	84554	36954954	A/G			
rs1035781	84691	36955091	A/G	0.73	0.77	0.100
rs1035782	84727	36955127	A/G			
rs1426411	85678	36956078	C/T	0.76	0.80	0.084
rs1834602	86699	36957099	C/T	0.20	0.16	0.072
rs1834603	86700	36957100	A/G	0.94	0.92	0.326
rs1834604	86792	36957192	A/G	0.70	0.73	0.287
rs1834605	86832	36957232	A/G	0.72	0.76	0.057
rs2162308	87045	36957445	A/G			
rs1365341	87140	36957540	A/G	0.18	0.15	0.086
rs1820458	87365	36957765	A/C	0.23	0.21	0.298
rs1469310	88342	36958742	C/T	0.20	0.18	0.265
rs3057879	88498	36958898	-/TCA	0.70	0.71	0.649
rs1469311	88589	36958989	A/G	0.70	0.74	0.065
rs768326	95502	36965902	A/G			
rs1863523	96968	36967368	C/T	0.21	0.18	0.247
rs1469312	97448	36967848	C/T	0.78	0.76	0.312
rs1469313	97568	36967968	C/T	0.81	0.80	0.617
rs1951773	98724	36969124	C/T			
rs2120655	Not mapped	Not mapped	T/G			
rs2181495	Not mapped	Not mapped	G/A	0.78	0.76	0.617

[0239] The *chrom 4* proximal SNPs were also allelotyped in the replication cohorts using the methods described herein and the primers provided in Tables 15 and 16. The replication allelotyping results for replication cohort #1 and replication cohort #2 are provided in Tables 18 and 19, respectively.

TABLE 18

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	A2 Case AF	A2 Control AF	p-Value
rs3849023	211	36870611	G/T			
rs1444311	7217	36877617	A/G	0.27	0.25	0.441
rs2044295	7895	36878295	A/C			
rs2166093	13308	36883708	C/T			
rs2376334	14279	36884679	G/T	0.14	0.14	0.970
rs1444320	17026	36887426	C/T			
rs2044294	18271	36888671	A/G	0.16	0.14	0.423
rs1899864	20417	36890817	C/T			
rs1562094	21843	36892243	A/G	0.22	0.21	0.725
rs1562098	22069	36892469	A/G			
rs1562097	22145	36892545	A/G			
rs1562096	22519	36892919	A/G	0.20	0.19	0.795
rs1562095	22539	36892939	A/G	0.55	0.53	0.453
rs1444319	23236	36893636	A/C	0.70	0.80	0.003
rs1444318	23256	36893656	A/C	0.12	0.13	0.645
rs1025938	23402	36893802	C/T	0.18	0.18	0.824
rs1025937	23499	36893899	A/C			
rs1025936	23620	36894020	C/T	0.85	0.83	0.622
rs1020333	23871	36894271	A/T			
rs2120654	24136	36894536	C/G	0.16	0.16	0.914
rs2588547	25427	36895827	A/G	0.40	0.40	0.980
rs2044293	25866	36896266	G/T			
rs2760324	26541	36896941	A/G	0.57	0.61	0.287
rs2588546	26576	36896976	G/T	0.08	0.05	0.265
rs2588545	26689	36897089	A/G			
rs2760328	26720	36897120	A/C	0.25	untyped	NA
rs2588544	27113	36897513	C/T			
rs2760331	27164	36897564	C/T	0.88	0.92	0.193
rs2588543	27186	36897586	A/G	0.57	0.58	0.869
rs2588542	28341	36898741	A/T			
rs2588541	29160	36899560	C/T	0.61	0.57	0.230
rs2588540	29844	36900244	A/G	0.64	0.64	0.926
rs2760336	30665	36901065	G/T			
rs2760337	30830	36901230	A/G	0.16	0.16	0.956
rs2028732	31061	36901461	A/C	0.60	0.57	0.330
rs2588538	31523	36901923	C/T	0.62	0.61	0.747
rs1992617	32326	36902726	C/T	0.62	0.59	0.341
rs1998469	32346	36902746	A/G			
rs1998470	32358	36902758	C/T	0.78	0.88	~0.0001
rs1975498	34909	36905309	C/T			
rs1562093	34975	36905375	A/G	0.89	0.90	0.905
rs1975497	35066	36905466	C/T	0.12	0.12	0.873
rs1562092	35096	36905496	G/T			
rs2248788	35375	36905775	C/T	0.28	0.31	0.308
rs1899862	36304	36906704	A/G	0.19	0.14	0.088
rs2588532	36712	36907112	A/T	0.30	0.33	0.347
rs1885878	36770	36907170	C/T	0.36	0.34	0.362
rs986648	37342	36907742	C/T	0.74	0.75	0.773
rs986647	37412	36907812	C/T	0.78	0.77	0.693
rs1010010	37884	36908284	A/G	0.25	0.26	0.690
rs1010009	38077	36908477	A/C	0.27	0.26	0.870
rs2760325	38300	36908700	C/T			
rs2588531	38301	36908701	C/T			
rs1838388	41189	36911589	C/T	0.74	0.75	0.826
rs1975495	44408	36914808	C/T			
rs2181491	44493	36914893	A/C	0.16	0.10	0.057
rs1975496	44571	36914971	A/G	0.25	0.26	0.596
rs2181492	44670	36915070	A/G	0.11	0.08	0.167
rs2224719	45219	36915619	A/G	0.78	0.79	0.705
rs2224720	45258	36915658	C/T	0.19	0.21	0.478
rs1951770	47261	36917661	A/G	0.25	0.16	0.003

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	A2 Case AF	A2 Control AF	p-Value
rs2296040	48473	36918873	A/C	0.39	0.43	0.241
rs1957723	48771	36919171	A/G	0.44	0.36	0.027
rs1957725	55292	36925692	C/T	0.73	0.80	0.024
rs2889346	56479	36926879	A/G	0.53	0.55	0.552
rs1885879	56747	36927147	A/C	0.43	0.50	0.057
rs1957726	60620	36931020	G/T	0.14	0.14	0.918
rs1957727	60688	36931088	A/C	0.71	0.78	0.038
rs1885880	61058	36931458	A/C	0.44	0.42	0.627
rs1885881	61129	36931529	C/T	0.12	0.12	0.833
rs942108	61577	36931977	C/T	0.42	0.49	0.096
rs1951771	61961	36932361	A/G	0.93	NA	NA
rs2376323	63351	36933751	G/T			
rs2013358	63926	36934326	A/G	0.13	0.12	0.795
rs2181494	65798	36936198	A/G	0.38	0.41	0.424
rs1957728	66043	36936443	A/C			
rs1957729	66044	36936444	A/G	0.78	0.77	0.672
rs1957730	66246	36936646	C/T	0.15	0.15	0.885
rs1957731	66318	36936718	C/T	0.15	0.16	0.719
rs1998468	66547	36936947	G/T	0.14	0.10	0.243
rs1957732	71238	36941638	C/T	0.10	0.09	0.817
rs1957733	71283	36941683	A/G	0.62	NA	0.628
rs2376322	71492	36941892	A/G	0.26	0.27	0.660
rs2889345	72274	36942674	A/G	0.22	0.16	0.020
rs1815267	73762	36944162	A/T	0.46	0.48	0.626
rs1957734	74209	36944609	G/T	0.44	0.61	~0.0001
rs1957735	75284	36945684	A/T	0.63	0.63	0.792
rs1957736	77347	36947747	A/C	0.03	0.03	0.987
rs1957737	77589	36947989	C/T	0.69	0.77	0.024
rs1957738	78096	36948496	A/G			
rs1957739	78606	36949006	A/G			
rs1957740	78862	36949262	G/T			
rs1957741	79135	36949535	A/G	0.75	0.83	0.008
rs1957742	79146	36949546	A/G	0.94	0.96	0.459
rs1957743	79456	36949856	C/T	0.24	0.14	0.009
rs1957744	79609	36950009	A/G	0.63	0.72	0.006
rs1957745	80086	36950486	A/G	0.86	0.90	0.229
rs1957746	80119	36950519	A/G	0.42	0.50	0.019
rs1957747	80766	36951166	C/T	0.71	0.79	0.009
rs2146670	81110	36951510	A/G	0.72	0.81	0.004
rs2146671	81269	36951669	A/T	0.17	0.13	0.106
rs1957748	81668	36952068	C/T	0.17	0.13	0.133
rs2162307	82433	36952833	C/T	0.72	0.78	0.020
rs1962839	82559	36952959	C/G			
rs2376315	83298	36953698	C/T	0.61	0.67	0.074
rs1426410	83821	36954221	A/G	0.73	0.79	0.058
rs1895921	84121	36954521	C/T	0.72	0.80	0.013
rs1895922	84147	36954547	C/T	0.17	0.11	0.014
rs1035779	84543	36954943	A/G	0.66	0.64	0.613
rs1035780	84554	36954954	A/G			
rs1035781	84691	36955091	A/G	0.71	0.78	0.059
rs1035782	84727	36955127	A/G			
rs1426411	85678	36956078	C/T	0.75	0.82	0.008
rs1834602	86699	36957099	C/T	0.22	0.15	0.020
rs1834603	86700	36957100	A/G	0.94	0.92	0.483
rs1834604	86792	36957192	A/G	0.69	0.75	0.056
rs1834605	86832	36957232	A/G	0.71	0.79	0.007
rs2162308	87045	36957445	A/G			
rs1365341	87140	36957540	A/G	0.19	0.13	0.017
rs1820458	87365	36957765	A/C	0.24	0.19	0.141
rs1469310	88342	36958742	C/T	0.22	0.17	0.061
rs3057879	88498	36958898	-/TCA	0.67	NA	NA
rs1469311	88589	36958989	A/G	0.67	0.76	0.006
rs768326	95502	36965902	A/G			

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	A2 Case AF	A2 Control AF	p-Value
rs1863523	96968	36967368	C/T	0.22	0.17	0.103
rs1469312	97448	36967848	C/T	0.80	0.77	0.236
rs1469313	97568	36967968	C/T	0.83	0.80	0.422
rs1951773	98724	36969124	C/T			
rs2120655	Not mapped	Not mapped	T/G			
rs2181495	Not mapped	Not mapped	G/A	0.78	0.76	0.617

TABLE 19

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	A2 Case AF	A2 Control AF	p-Value
rs3849023	211	36870611	G/T			
rs1444311	7217	36877617	A/G	0.25	0.26	0.876
rs2044295	7895	36878295	A/C			
rs2166093	13308	36883708	C/T			
rs2376334	14279	36884679	G/T	0.16	0.18	0.532
rs1444320	17026	36887426	C/T			
rs2044294	18271	36888671	A/G	NA	0.15	NA
rs1899864	20417	36890817	C/T			
rs1562094	21843	36892243	A/G	NA	0.28	NA
rs1562098	22069	36892469	A/G			
rs1562097	22145	36892545	A/G			
rs1562096	22519	36892919	A/G	0.20	0.23	0.364
rs1562095	22539	36892939	A/G	0.50	0.48	0.588
rs1444319	23236	36893636	A/C	0.79	0.79	0.923
rs1444318	23256	36893656	A/C	0.12	0.13	0.711
rs1025938	23402	36893802	C/T	0.18	0.22	0.247
rs1025937	23499	36893899	A/C			
rs1025936	23620	36894020	C/T	0.84	0.86	0.403
rs1020333	23871	36894271	A/T			
rs2120654	24136	36894536	C/G	0.14	0.16	0.682
rs2588547	25427	36895827	A/G	0.37	NA	
rs2044293	25866	36896266	G/T			
rs2760324	26541	36896941	A/G	0.60	0.60	0.965
rs2588546	26576	36896976	G/T	0.05	0.06	0.797
rs2588545	26689	36897089	A/G			
rs2760328	26720	36897120	A/C	0.25	0.26	0.816
rs2588544	27113	36897513	C/T			
rs2760331	27164	36897564	C/T	0.95	0.96	0.597
rs2588543	27186	36897586	A/G	0.60	0.61	0.801
rs2588542	28341	36898741	A/T			
rs2588541	29160	36899560	C/T	0.62	0.61	0.972
rs2588540	29844	36900244	A/G	0.60	0.59	0.810
rs2760336	30665	36901065	G/T			
rs2760337	30830	36901230	A/G	0.16	0.17	0.659
rs2028732	31061	36901461	A/C	0.60	0.60	0.976
rs2588538	31523	36901923	C/T	0.61	0.61	0.912
rs1992617	32326	36902726	C/T	0.61	0.59	0.583
rs1998469	32346	36902746	A/G			
rs1998470	32358	36902758	C/T	0.84	0.81	0.338
rs1975498	34909	36905309	C/T			
rs1562093	34975	36905375	A/G	0.88	0.84	0.199
rs1975497	35066	36905466	C/T	0.13	0.15	0.613
rs1562092	35096	36905496	G/T			
rs2248788	35375	36905775	C/T	0.30	0.31	0.884
rs1899862	36304	36906704	A/G	0.17	0.18	0.563
rs2588532	36712	36907112	A/T	0.29	0.29	0.952
rs1885878	36770	36907170	C/T	0.33	0.36	0.405
rs986648	37342	36907742	C/T	0.75	0.72	0.283
rs986647	37412	36907812	C/T	0.79	0.74	0.186

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	A2 Case AF	A2 Control AF	p-Value
rs1010010	37884	36908284	A/G	0.25	0.26	0.843
rs1010009	38077	36908477	A/C	0.25	0.24	0.764
rs2760325	38300	36908700	C/T			
rs2588531	38301	36908701	C/T			
rs1838388	41189	36911589	C/T	0.76	0.72	0.284
rs1975495	44408	36914808	C/T			
rs2181491	44493	36914893	A/C	0.12	0.15	0.464
rs1975496	44571	36914971	A/G	0.27	0.25	0.577
rs2181492	44670	36915070	A/G	0.10	0.11	0.844
rs2224719	45219	36915619	A/G	0.78	0.75	0.426
rs2224720	45258	36915658	C/T	0.21	0.20	0.790
rs1951770	47261	36917661	A/G	0.19	0.20	0.796
rs2296040	48473	36918873	A/C	0.43	0.42	0.804
rs1957723	48771	36919171	A/G	0.41	0.42	0.653
rs1957725	55292	36925692	C/T	0.77	0.75	0.439
rs2889346	56479	36926879	A/G	0.56	0.56	0.948
rs1885879	56747	36927147	A/C	0.46	0.45	0.959
rs1957726	60620	36931020	G/T	0.14	0.15	0.673
rs1957727	60688	36931088	A/C	0.76	0.73	0.255
rs1885880	61058	36931458	A/C	0.43	0.45	0.614
rs1885881	61129	36931529	C/T	0.13	0.10	0.346
rs942108	61577	36931977	C/T	0.58	0.56	0.730
rs1951771	61961	36932361	A/G			
rs2376323	63351	36933751	G/T			
rs2013358	63926	36934326	A/G	0.13	0.15	0.469
rs2181494	65798	36936198	A/G	0.46	0.47	0.820
rs1957728	66043	36936443	A/C			
rs1957729	66044	36936444	A/G	0.80	0.78	0.440
rs1957730	66246	36936646	C/T	0.15	0.17	0.668
rs1957731	66318	36936718	C/T	0.14	0.16	0.387
rs1998468	66547	36936947	G/T	0.12	0.13	0.615
rs1957732	71238	36941638	C/T	0.09	0.11	0.469
rs1957733	71283	36941683	A/G	0.60	0.02	
rs2376322	71492	36941892	A/G	0.27	0.29	0.582
rs2889345	72274	36942674	A/G	0.17	0.21	0.308
rs1815267	73762	36944162	A/T	0.46	0.41	0.151
rs1957734	74209	36944609	G/T	0.68	0.69	0.766
rs1957735	75284	36945684	A/T	0.62	0.58	0.311
rs1957736	77347	36947747	A/C	0.07	0.08	0.688
rs1957737	77589	36947989	C/T	0.75	0.71	0.305
rs1957738	78096	36948496	A/G			
rs1957739	78606	36949006	A/G			
rs1957740	78862	36949262	G/T			
rs1957741	79135	36949535	A/G	0.78	0.76	0.446
rs1957742	79146	36949546	A/G	0.96	0.96	0.938
rs1957743	79456	36949856	C/T	0.17	0.19	0.667
rs1957744	79609	36950009	A/G	0.69	0.66	0.423
rs1957745	80086	36950486	A/G	0.90	0.89	0.738
rs1957746	80119	36950519	A/G	0.37	0.35	0.708
rs1957747	80766	36951166	C/T	0.72	0.70	0.639
rs2146670	81110	36951510	A/G	0.75	0.72	0.306
rs2146671	81269	36951669	A/T	0.16	0.17	0.806
rs1957748	81668	36952068	C/T	0.14	0.17	0.453
rs2162307	82433	36952833	C/T	0.76	0.73	0.465
rs1962839	82559	36952959	C/G			
rs2376315	83298	36953698	C/T	0.64	0.63	0.767
rs1426410	83821	36954221	A/G	0.77	0.74	0.465
rs1895921	84121	36954521	C/T	0.78	0.75	0.320
rs1895922	84147	36954547	C/T	0.12	0.13	0.586
rs1035779	84543	36954943	A/G	NA	0.65	NA
rs1035780	84554	36954954	A/G			
rs1035781	84691	36955091	A/G	0.75	0.76	0.830
rs1035782	84727	36955127	A/G			

dbSNP rs#	Position in SEQ ID NO: 2	Chromosome Position	A1/A2 Allele	A2 Case AF	A2 Control AF	p-Value
rs1426411	85678	36956078	C/T	0.78	0.76	0.488
rs1834602	86699	36957099	C/T	0.18	0.18	0.945
rs1834603	86700	36957100	A/G	0.95	NA	
rs1834604	86792	36957192	A/G	0.72	0.69	0.427
rs1834605	86832	36957232	A/G	0.73	0.72	0.647
rs2162308	87045	36957445	A/G			
rs1365341	87140	36957540	A/G	0.16	0.17	0.667
rs1820458	87365	36957765	A/C	0.23	0.24	0.670
rs1469310	88342	36958742	C/T	0.19	0.21	0.592
rs3057879	88498	36958898	-/TCA	0.74	0.71	0.478
rs1469311	88589	36958989	A/G	0.74	0.72	0.582
rs768326	95502	36965902	A/G			
rs1863523	96968	36967368	C/T	0.20	0.21	0.687
rs1469312	97448	36967848	C/T	0.76	0.75	0.807
rs1469313	97568	36967968	C/T	0.78	0.79	0.824
rs1951773	98724	36969124	C/T			
rs2120655	Not mapped	Not mapped	T/G			
rs2181495	Not mapped	Not mapped	G/A			

[0240] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 1B for the discovery cohort. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 1B can be determined by consulting Table 17. For example, the left-most X on the left graph is at position 36870611. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0241] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The generally bottom-most curve is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0242] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken

horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is placed at the 3' end of each gene to show the direction of transcription.

Example 6

Chrom 6 Region Proximal SNPs

[0243] It has been discovered that SNPs rs756519, rs1042327 and rs8770 on chromosome 6 (6q27) are associated with occurrence of osteoarthritis in subjects. This region contains genes that encode proteasome (prosome, macropain) subunit, beta type, 1 (*PSMB1*), TATA box binding protein (*TBP*), and programmed cell death 2 (*PDCD2*).

[0244] One hundred-nine additional allelic variants proximal to rs756519, rs1042327 and rs8770 were identified and subsequently allelotyped in osteoarthritis case and control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 20. The chromosome positions provided in column four of Table 20 are based on Genome "Build 34" of NCBI's GenBank.

TABLE 20

dbSNP rs#	Chromosome	Position in SEQ ID NO: 3	Chromosome Position	Allele Variants
rs1474555	6	229	170689279	c/t
rs1474554	6	6310	170695360	a/g
rs10334	6	11840	170700890	g/t
rs10541	6	11870	170700920	a/t
rs3823299	6	12064	170701114	a/g
rs742348	6	13392	170702442	c/g
rs1474644	6	16354	170705404	a/g
rs1474643	6	16559	170705609	c/t
rs2056970	6	16935	170705985	a/g
rs2223474	6	17616	170706666	c/t
rs2206284	6	17737	170706787	c/t
rs756519	6	18321	170707371	c/t
rs756518	6	18453	170707503	a/g
rs756517	6	18811	170707861	c/t
rs1474642	6	20020	170709070	c/t
rs2038093	6	21662	170710712	c/g
rs2038092	6	23197	170712247	c/g
rs2223473	6	23446	170712496	g/t
rs760909	6	24339	170713389	g/t
rs2076319	6	25504	170714554	a/g
rs3778589	6	27174	170716224	a/g
rs3800236	6	28008	170717058	a/t
rs2206286	6	29294	170718344	c/t
rs12717	6	29759	170718809	c/g
rs2179373	6	30832	170719882	a/g
rs3800235	6	44512	170733562	a/c
rs3823298	6	44850	170733900	c/g
rs2076318	6	45884	170734934	a/g
rs2235506	6	46345	170735395	c/t
rs2072916	6	48589	170737639	a/g
rs3734763	6	53371	170742421	a/g

dbSNP rs#	Chromosome	Position in SEQ ID NO: 3	Chromosome Position	Allele Variants
rs3177571	6	53911	170742961	g/t
rs8770	6	53990	170743040	a/g
rs3173219	6	55152	170744202	c/g
rs960744	6	55667	170744717	c/t
rs2066954	6	58952	170748002	a/c
rs2072917	6	59315	170748365	g/t
rs3173220	6	60029	170749079	a/g
rs734249	6	61477	170750527	a/c
rs2092310	6	62988	170752038	c/t
rs2092309	6	63090	170752140	c/g
rs1016536	6	64021	170753071	a/c
rs2235506	6	65685	170754735	c/t
rs2076998	6	70220	170759270	a/g
rs2076997	6	70323	170759373	a/c
rs2345478	6	70959	170760009	a/c
rs2021899	6	73436	170762486	c/g
rs2021898	6	82945	170771995	a/g
rs2345682	6	82958	170772008	g/t
rs2345683	6	82961	170772011	c/g
rs2881195	6	82964	170772014	c/t
rs2345684	6	82965	170772015	g/t
rs3046261	6	83006	170772056	-/cttt
rs4083413	6	83025	170772075	c/t
rs4083412	6	83034	170772084	a/g
rs2345685	6	83074	170772124	g/t
rs2021897	6	83132	170772182	g/t
rs4036211	6	83155	170772205	c/t
rs4036212	6	83172	170772222	a/t
rs4036213	6	83174	170772224	g/t
rs2345686	6	83206	170772256	c/t
rs4036214	6	83216	170772266	g/t
rs4036215	6	83234	170772284	g/t
rs2345687	6	83252	170772302	a/g
rs2345688	6	83260	170772310	a/c
rs2881196	6	83263	170772313	a/c
rs3046288	6	83296	170772346	-/at
rs4036216	6	83319	170772369	a/g
rs4036205	6	83322	170772372	c/g
rs2092307	6	83324	170772374	a/c
rs4036206	6	83357	170772407	c/g
rs2345689	6	83375	170772425	c/t
rs2345690	6	83381	170772431	c/t
rs2345691	6	83389	170772439	a/t
rs2345692	6	83443	170772493	a/g
rs3046306	6	83499	170772549	-/ggtg
rs4036207	6	83545	170772595	c/t
rs2345693	6	83566	170772616	c/t
rs2345694	6	83591	170772641	c/t
rs2345695	6	83619	170772669	g/t
rs2345696	6	83698	170772748	a/g
rs4036209	6	83780	170772830	g/t
rs2345697	6	83784	170772834	g/t

dbSNP rs#	Chromosome	Position in SEQ ID NO: 3	Chromosome Position	Allele Variants
rs2881197	6	83826	170772876	g/t
rs2345698	6	83832	170772882	c/t
rs2345699	6	83852	170772902	c/t
rs2744640	6	86297	170775347	c/t
rs2744639	6	86315	170775365	g/t
rs2744638	6	86420	170775470	c/g
rs2744637	6	86460	170775510	c/g
rs2744636	6	86714	170775764	c/t
rs2744635	6	86718	170775768	c/t
rs2744634	6	86736	170775786	c/g
rs2744633	6	86753	170775803	c/t
rs2744632	6	86766	170775816	g/t
rs2744630	6	88162	170777212	c/g
rs2744629	6	88218	170777268	a/g
rs2744628	6	88246	170777296	a/g
rs2744627	6	88255	170777305	c/t
rs2977616	6	88309	170777359	g/t
rs2977617	6	88310	170777360	a/t
rs2744626	6	88471	170777521	a/g
rs2744625	6	88619	170777669	c/t
rs3115847	6	88904	170777954	c/t
rs2744623	6	89044	170778094	c/g
rs4036193	6	90531	170779581	-/aaaaa
rs4036194	6	90534	170779584	a/g
rs4036196	6	90613	170779663	c/g
rs1042327	6	46252	170735302	c/t

Assay for Verifying and Allelotyping SNPs

[0245] The methods used to verify and allelotype the 109 proximal SNPs of Table 20 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 21 and Table 22, respectively.

TABLE 21

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs1474555	ACGTTGGATGACATCAACTGAAGCCGACAG	ACGTTGGATGAATGGTGAATGTGATGAGA
rs1474554	ACGTTGGATGATACACCTAGGACACCTCCA	ACGTTGGATGCAGAAGGAGATAAACCCAGC
rs10334	ACGTTGGATGAACAGTTTCCTCCCTGATGC	ACGTTGGATGCGGCTGGTGAAAGATGTCTT
rs10541	ACGTTGGATGACTATGCAGATCCGGAGTGC	ACGTTGGATGGTCCTTGGACAGAGCCATG
rs3823299	ACGTTGGATGCTCATGTGTACGAGGATTTG	ACGTTGGATGGTCTGGAAGGGTCTTTATTC
rs742348	ACGTTGGATGTGTGGATTTTCCAGTGCTCG	ACGTTGGATGCTGTACTTGAACCTCCAAGC
rs1474644	ACGTTGGATGGCAAGACAAGCATAATTGGG	ACGTTGGATGTAAAGGGCATTTTGGCTTCC
rs1474643	ACGTTGGATGTCTCCCAAATTAAAAGTGGC	ACGTTGGATGGATACCAAAGTCCTACTTAC
rs2056970	ACGTTGGATGTGGGACTACAGGAAGAGAAG	ACGTTGGATGCAAACACAGACCTTCAGCC
rs2223474	ACGTTGGATGCCAGGGTAAAGAAAAGATCC	ACGTTGGATGAGAGGCTTACCTCCTAAAAG
rs2206284	ACGTTGGATGTACATACTAGGTGGATCCC	ACGTTGGATGAAAGAGGAGAACACAGGATG
rs756519	ACGTTGGATGTCTAGAGACACCTGAGGTTG	ACGTTGGATGTGTTTCACTTCAGAGCCCTG
rs756518	ACGTTGGATGCCCAGATTAGACTCTCTAAC	ACGTTGGATGAAATAGCTGAGCTGCCATTG

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs756517	ACGTTGGATGCTCGGTTGTTGACTCCTATC	ACGTTGGATGGCGGATGTTAAGAGTCAGAG
rs1474642	ACGTTGGATGGGAGGTCATACATTAGCTTC	ACGTTGGATGTACCATCTGACACAATTCTC
rs2038093	ACGTTGGATGGAGACAGAGTTTCACTCTTG	ACGTTGGATGTAATCACTTGAACCCAGGAG
rs2038092	ACGTTGGATGTTACCTGAGGTCAGGAGTTT	ACGTTGGATGCCACACCCAGCTGATTTTTG
rs2223473	ACGTTGGATGCCTTTATGTTATTGCTTTCC	ACGTTGGATGCAGGGAAATTTAAGAATAGC
rs760909	ACGTTGGATGGGAAGAGGCAAGCTTAGTTC	ACGTTGGATGGCAGCATTAACGAATGCCTG
rs2076319	ACGTTGGATGGACATTTCACAATGCCTTTG	ACGTTGGATGCCAACAGCAACTTAAAACTC
rs3778589	ACGTTGGATGGCAAGAGAGAGAAAAGTTCC	ACGTTGGATGGTGTCTTCTGTCCCATTTCAC
rs3800236	ACGTTGGATGAGAGAATGAGGCCTCATTTT	ACGTTGGATGCTCAGTCATTGTTCTTTTTT
rs2206286	ACGTTGGATGTTTACAGACGCTAACCCTCTAC	ACGTTGGATGAACATAGCCTCTGCTCTGTG
rs12717	ACGTTGGATGAAAATCGCAGCTGCAAAGGG	ACGTTGGATGAGACAGCAAGTGTCCGATCC
rs2179373	ACGTTGGATGGAAGTGACCTATGCTCACAC	ACGTTGGATGAATGTCACTTCCGCCAGTTC
rs3800235	ACGTTGGATGCTATGTGTTGATACCTCCAAG	ACGTTGGATGGCTTCATAAATGAACTGAAC
rs3823298	ACGTTGGATGGGTGGTTTCTTGTCTTGATG	ACGTTGGATGTTTTTGTCCCAGAGCATCTG
rs2076318	ACGTTGGATGTCCGCCAAATTATTGTAGCC	ACGTTGGATGCTCAGTAGAAATGCATGGGC
rs2235506	ACGTTGGATGTAACCATGTCAACTGTTCTC	ACGTTGGATGCCACCAACAATTTAGTAGG
rs2072916	ACGTTGGATGACGCTGGAGTCACTAAGATG	ACGTTGGATGCAGATTAAGGCACAGGCATG
rs3734763	ACGTTGGATGGCCTTTTGCCTTTCAGTGTC	ACGTTGGATGTAAAGAGGCTGGACCTTCAG
rs3177571	ACGTTGGATGGTCTGTTGTCAATATAGGTG	ACGTTGGATGACAAAAGTGTCCAGTGACAG
rs8770	ACGTTGGATGAATTCCCTGTCACTGGACAC	ACGTTGGATGCCAAAAATAGAGGTGCAGAG
rs3173219	ACGTTGGATGACATAACCACACTGGAGGTG	ACGTTGGATGCCTAGTTTTTCAGACACGGTC
rs960744	ACGTTGGATGAAAGGCATGTCACAGTTCCC	ACGTTGGATGGCCCTCTGAGTCAGATAAAC
rs2066954	ACGTTGGATGGAGGTTCTGGGTATAACTTTC	ACGTTGGATGCTACAAACCAGTAAGCTGATG
rs2072917	ACGTTGGATGTGCTAGGCACTCACACTATC	ACGTTGGATGAGGCTTGGTAAGTTCCTCTG
rs3173220	ACGTTGGATGTATCTGGGTTGACAAAGGCG	ACGTTGGATGACATAAGCAGGCTTGTGCAC
rs734249	ACGTTGGATGAGGTGGACACCAGCAGGGAA	ACGTTGGATGTCACCTCTGCACATGTCTTG
rs2092310	ACGTTGGATGTTAGTCAGGTAAAGCGGGAC	ACGTTGGATGTCAGTGGAAGGCTGATCAAG
rs2092309	ACGTTGGATGATCTAATTGCTTCCCCTCCC	ACGTTGGATGCAGCCTTCCACTGAATACAC
rs1016536	ACGTTGGATGCCCCAAAAATTGGAGACAGG	ACGTTGGATGGGCTGTCATAATCGTGTGTC
rs2235506	ACGTTGGATGAAGTGATTCTCCTGCCTCAG	ACGTTGGATGTGGTGAAACCCTGTCTCTAC
rs2076998	ACGTTGGATGGCTCTGTGATTTTCGATGATG	ACGTTGGATGAGCTACTTCTTGCAGGAGTC
rs2076997	ACGTTGGATGCAGAGCTTCCAAGTGTTTTTC	ACGTTGGATGAAAGGAGTGCTTAAAGGAGC
rs2345478	ACGTTGGATGCCTTCAACAAGTGCTGACAC	ACGTTGGATGATCCAGGCATTATTGCCAGC
rs2021899	ACGTTGGATGGTTTTGTGGTGGATGATGGG	ACGTTGGATGAGAGTGCCCATATGGACAG
rs2021898	ACGTTGGATGCGCAAGAAACTCCTTGGATG	ACGTTGGATGCCAATTAAAGCCAAGGTCAC
rs2345682	ACGTTGGATGATTTCGCAAGAAACTCCTTGG	ACGTTGGATGGGAAGAAATCTTACCAGAAC
rs2345683	ACGTTGGATGATTTCGCAAGAAACTCCTTGG	ACGTTGGATGGGAAGAAATCTTACCAGAAC
rs2881195	ACGTTGGATGATTTCGCAAGAAACTCCTTGG	ACGTTGGATGGGAAGAAATCTTACCAGAAC
rs2345684	ACGTTGGATGATTTCGCAAGAAACTCCTTGG	ACGTTGGATGGGAAGAAATCTTACCAGAAC
rs3046261	ACGTTGGATGCTCCACTCAGACATCAAAAG	ACGTTGGATGGTGACCTTGGCTTTAATTGG
rs4083413	ACGTTGGATGGTGACCTTGGCTTTAATTGG	ACGTTGGATGCTCCACTCAGACATCAAAAG
rs4083412	ACGTTGGATGGTGACCTTGGCTTTAATTGG	ACGTTGGATGCTCCACTCAGACATCAAAAG
rs2345685	ACGTTGGATGGTTCTGGTAAGATTTCTTCC	ACGTTGGATGAGTCTTACAATAGATGACTG
rs2021897	ACGTTGGATGGCAATTATTTACAGAAGCCC	ACGTTGGATGTCCCACACAGTCATCTATTG
rs4036211	ACGTTGGATGCCCATTACAAGTTGGGCAGTT	ACGTTGGATGCTTTCTGATTCTTTTTTTTTTCC
rs4036212	ACGTTGGATGCTTTCTGATTCTTTTTTTTTTCC	ACGTTGGATGCCCATTACAAGTTGGGCAGTT
rs4036213	ACGTTGGATGCCCATTACAAGTTGGGCAGTT	ACGTTGGATGCTTTCTGATTCTTTTTTTTTTCC
rs2345686	ACGTTGGATGCCCATTACAAGTTGGGCAGTT	ACGTTGGATGCTTTCTGATTCTTTTTTTTTTCC
rs4036214	ACGTTGGATGCCCATTACAAGTTGGGCAGTT	ACGTTGGATGCTTTCTGATTCTTTTTTTTTTCC
rs4036215	ACGTTGGATGCTTTCTGATTCTTTTTTTTTTCC	ACGTTGGATGCCCATTACAAGTTGGGCAGTT
rs2345687	ACGTTGGATGGGATTGTAAGGTGAGACTTG	ACGTTGGATGTTCTCTCCCATTAACAAGTTG
rs2345688	ACGTTGGATGAGGGTCCCATCTAAGAATTC	ACGTTGGATGGGATTGTAAGGTGAGACTTG

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs2881196	ACGTTGGATGAGGGTCCCATCTAAGAATTC	ACGTTGGATGGGATTGTAAGGTGAGACTTG
rs3046288	ACGTTGGATGCCAACTTGTAATGGGGAGGA	ACGTTGGATGCAGTTTTTACAGAGGGTCCC
rs4036216	ACGTTGGATGCTTGTAATGGGGAGGAAAAAA	ACGTTGGATGTTCTCATTTTAATCTGTCAG
rs4036205	ACGTTGGATGCTTGTAATGGGGAGGAAAAAA	ACGTTGGATGTTCTCATTTTAATCTGTCAG
rs2092307	ACGTTGGATGCTTGTAATGGGGAGGAAAAAA	ACGTTGGATGTTCTCATTTTAATCTGTCAG
rs4036206	ACGTTGGATGGACCCTCTGTAAAACTGAC	ACGTTGGATGCCACTGCACCTCAAATCTTC
rs2345689	ACGTTGGATGTTCCCTGAGTATCTCCCATG	ACGTTGGATGGGGACCCTCTGTAAAACTG
rs2345690	ACGTTGGATGTTCCCTGAGTATCTCCCATG	ACGTTGGATGGGGACCCTCTGTAAAACTG
rs2345691	ACGTTGGATGGCCACCTGTTGGAGATTTAC	ACGTTGGATGGGGACCCTCTGTAAAACTG
rs2345692	ACGTTGGATGTACATGGGAGATACTCAGGG	ACGTTGGATGCCACTGCACCTCAAATCTTC
rs3046306	ACGTTGGATGGTATAACAAACCTTACCCTTG	ACGTTGGATGTAAAGAAAGAAGATTTGAGG
rs4036207	ACGTTGGATGTATCAATGGAGAATGCGTGG	ACGTTGGATGGGGAGTTAACCAGCAAAAGC
rs2345693	ACGTTGGATGTCGACAACAAGAAGAGAAGG	ACGTTGGATGCACATTAGACAAGGGTAAGG
rs2345694	ACGTTGGATGCTACCTCTCTCGACAACAAG	ACGTTGGATGCTTAAGTCCACGCATTCTCC
rs2345695	ACGTTGGATGCGCATTCTCCATTGATAAGAC	ACGTTGGATGCCATTTAAAAGCTACCTCTC
rs2345696	ACGTTGGATGCCTTACACAAGTGTAACCTC	ACGTTGGATGCCCCAAAATATAATGGTAGG
rs4036209	ACGTTGGATGGGAACACAGTGTATAAGACC	ACGTTGGATGGTTTTTCACAACTTCGTTAGC
rs2345697	ACGTTGGATGGTTTTTCACAACTTCGTTAGC	ACGTTGGATGGCCACCCCAAAATATAATGG
rs2881197	ACGTTGGATGGCTGGAGGAAAAACAAGAAC	ACGTTGGATGCCTACCATTATATTTTGGGG
rs2345698	ACGTTGGATGCTGGAGGAAAAACAAGAACTC	ACGTTGGATGCATTATATTTTGGGGTGGCAT
rs2345699	ACGTTGGATGGCTGGAGGAAAAACAAGAAC	ACGTTGGATGGGGTGGCATATTTTGGTCTT
rs2744640	ACGTTGGATGGCAACAGCACTTAGTATGCC	ACGTTGGATGTGTGAAGCTGCAAATCTGGC
rs2744639	ACGTTGGATGGCAACAGCACTTAGTATGCC	ACGTTGGATGTGTGAAGCTGCAAATCTGGC
rs2744638	ACGTTGGATGAACCGTGGCAATACCACGTC	ACGTTGGATGTGGGTTTGGGCTGGATTTGG
rs2744637	ACGTTGGATGTGAGTTGACAGCCTCTGCTGG	ACGTTGGATGCACGTCAGTAAGGCAGAGAC
rs2744636	ACGTTGGATGTCGGAGATGACATTGTCACC	ACGTTGGATGTTCCAGGGGTACGTGTGTG
rs2744635	ACGTTGGATGTGAGTCTGACTGTGTCACGG	ACGTTGGATGTCGGAGATGACATTGTCACC
rs2744634	ACGTTGGATGCGTGTTCCAGGGATTATATG	ACGTTGGATGGCACATAACGCTTGGAACCTC
rs2744633	ACGTTGGATGTATGAGTGTGACGGGTGTAG	ACGTTGGATGGCACATAACGCTTGGAACCTC
rs2744632	ACGTTGGATGTAGCTGCCTTCCACATCCAA	ACGTTGGATGTGTGACGGGTGTAGCGTTAG
rs2744630	ACGTTGGATGGGGTTCAAATGCCTCTGATAG	ACGTTGGATGGGTCTAGGACAAGACCCATT
rs2744629	ACGTTGGATGAACCTTTCCCTTAGCCAGTGG	ACGTTGGATGATCAGAGGCATTTGAACCCC
rs2744628	ACGTTGGATGTTGACCTCAAATCATGTCAC	ACGTTGGATGTATCAGAGGCATTTGAACCCC
rs2744627	ACGTTGGATGGGGTGGTTTATGTTCCACTG	ACGTTGGATGCCAGAACTAATGCTAGCTTC
rs2977616	ACGTTGGATGTTCCACTGGCTAAGAGAAAG	ACGTTGGATGCCAGAACTAATGCTAGCTTC
rs2977617	ACGTTGGATGCCAGAACTAATGCTAGCTTC	ACGTTGGATGTTCCACTGGCTAAGAGAAAG
rs2744626	ACGTTGGATGACAGTGAAATTGTATTTCCG	ACGTTGGATGGCACAACTTAAGAATCTCC
rs2744625	ACGTTGGATGAGCAAAATCCACCTATGTCC	ACGTTGGATGCTGAATTTTGTCTCCAGTAC
rs3115847	ACGTTGGATGTCGAGGCAGAGGCGTAGTA	ACGTTGGATGATAGGAATGACATGAACCCG
rs2744623	ACGTTGGATGACGCGAGTCCGTAGGTGCTG	ACGTTGGATGAAGAGGCTGCTACCCAGAG
rs4036193	ACGTTGGATGAGAGCAAGACTCCGTCTCAA	ACGTTGGATGACATGTCGCTTGATGTGTGC
rs4036194	ACGTTGGATGACATGTCGCTTGATGTGTGC	ACGTTGGATGAGAGCAAGACTCCGTCTCAA
rs4036196	ACGTTGGATGCCCCAGCGTTCATATTTGTC	ACGTTGGATGTCTGGCCAAATGGTCATACC
rs1042327	ACGTTGGATGAACCTTCACATCACAGCTCCC	ACGTTGGATGCAGAAGTTGGGTTTTCCAGC

TABLE 22

dbSNP rs#	Extend Primer	Term Mix
rs1474555	TGAAGCCGACAGTGACACC	ACT
rs1474554	CCAATTTTGCACACCTCCAGCA	ACG

dbSNP rs#	Extend Primer	Term Mix
rs10334	CAGATCCGGAGTGCGTCC	CGT
rs10541	TCTCTCTCAGCCGCAGAA	CGT
rs3823299	GAGGATTTGTGATGAAAATACTA	ACG
rs742348	AATCCCCGTGTTGTTCAAGG	ACT
rs1474644	AAGGATGTTTCATCATAGTGTTTA	ACG
rs1474643	ACATGTTTATACATACACTCATG	ACG
rs2056970	TTGGCAGCTTTTTAGGCCTC	ACT
rs2223474	AAGTCTCAAAAAGGTCCC	ACT
rs2206284	TAGGTGGATCCCTTTTCCC	ACG
rs756519	CAGAGCCCTGTTCTTTGATTT	ACG
rs756518	CAAAGGATGCTGTCTGGCC	ACG
rs756517	GTTCCATGAGCGTTTTCTTTG	ACG
rs1474642	CTTCAGTTTCTTCATCACTTTC	ACT
rs2038093	TTTCACTCTTGTTGCCCAGG	ACT
rs2038092	CCAACATGGTGAAACCCCATCT	ACT
rs2223473	TAGAATTAAATTAGACTTTGGGG	ACT
rs760909	GCAAGCTTAGTTCTAGGTCAG	CGT
rs2076319	TCACAATGCCTTTGTAATGATTT	ACT
rs3778589	GTTTTAGGAAGACTGCTCTGACAA	ACG
rs3800236	CTGAGAGCCAGCTGCAGTAA	CGT
rs2206286	CCTCGCCGGCTGGCATAA	ACT
rs12717	CCATCCCCAAGTCTCTGCCAG	ACT
rs2179373	TGACCTATGCTCACACTTCTCA	ACG
rs3800235	GTGTTGATACCTCCAAGTACATTT	CGT
rs3823298	CTTGATGAAATAGTCATCCAATA	ACT
rs2076318	TGAATTATCACCATCATCA	ACT
rs2235506	TGTTGCCAATAACAATCA	ACG
rs2072916	TGTGACAAGGGATTCCAC	ACG
rs3734763	CATCTGTAAGCAGGGCCGC	ACG
rs3177571	AAGACTGTGTAGCCTTCCTCTG	ACT
rs8770	GTAGACACTGTGTAAGCAATC	ACG
rs3173219	CACTGGAGGTGGAGAGCA	ACT
rs960744	CCCCATCAGACCTGGCTGT	ACT
rs2066954	TTACAATTTGAGCCTTGAGC	CGT
rs2072917	CTATCCCGACCCGAGAAAC	CGT
rs3173220	GCGATGAAACTGAACTGA	ACT
rs734249	CACCAGCAGGGAAGGTTTG	CGT
rs2092310	TTGAGGTGAGGGCTTCCAG	ACT
rs2092309	TCCCCTCCCCTATTGTTTAC	ACT
rs1016536	AAATTGGAGACAGGTCTCAGT	ACT
rs2235506	CTGGGAGTACAGGTGCGC	ACT
rs2076998	GTTTTTGTATAGTCTGCAGATGC	ACT
rs2076997	ATCCATTTTAATGGGTTGCTAGCT	ACT
rs2345478	ACAACGTACTTATTGGGCATA	ACT
rs2021899	CTTTCTTGGAACCTTTCCCA	ACT
rs2021898	TTGGATGGGGTTAATGGCAG	ACG
rs2345682	GTTAATGGCAGCTGTATTTTTCTG	ACT
rs2345683	GGCAGCTGTATTTTTCTGTGA	ACT
rs2881195	CAGCTGTATTTTTCTGTGACCT	ACG

dbSNP rs#	Extend Primer	Term Mix
rs2345684	GCAGCTGTATTTTTCTGTGACCTT	ACT
rs3046261	GAAAACATTTGAGATACTGAAGAT	ACT
rs4083413	TTCCTTTATCTTCAGTATCTCAA	ACT
rs4083412	TCTTCAGTATCTCAAATGTTTTCA	ACG
rs2345685	CAACTTTTGATGTCTGAGTGGA	ACT
rs2021897	ATTATTTACAGAAGCCCTATTCA	ACT
rs4036211	TTTCCAAACAAAAGCTACCATGCA	ACT
rs4036212	AAATAATTGCATGGTAGCTTTTG	CGT
rs4036213	ACAACACTTTTGATGTTATTTCC	CGT
rs2345686	ACAATCCAAAAATCACATTCCTA	ACT
rs4036214	GTCTCACCTTACAATCCAAAAAT	CGT
rs4036215	AATGTGATTTTTGGATTGTAAGG	ACT
rs2345687	AAGGTGAGACTTGTTTAGCTTT	ACT
rs2345688	TCCTCCCCATTACAAGTTGGGCA	ACT
rs2881196	TTTTCTCCCCATTACAAGTTGG	ACT
rs3046288	TAATGGGGAGGAAAAAATTTTCT	ACT
rs4036216	ATGTTTTTGGAATTCTTAGATGG	ACT
rs4036205	GTTTTTGGAATTCTTAGATGGGAC	ACT
rs2092307	TGGAATTCTTAGATGGGACCC	ACT
rs4036206	ACTGACAGATTAATAATGAGAAAA	ACT
rs2345689	TCCCATGTATCCATAAGGTATAC	ACT
rs2345690	GTATCTCCCATGTATCCATAAG	ACT
rs2345691	CCCTGAGTATCTCCCATGTA	CGT
rs2345692	TCTCCAACAGGTGGCTTTCA	ACT
rs3046306	TTGCTGGTTAACTCCCCACT	CGT
rs4036207	GCGTGGACTTAAGTCTGTATAAC	ACT
rs2345693	AGAGTCTTATCAATGGAGAATGC	ACT
rs2345694	GAAGAGAAGGATAACTAAATCACT	ACT
rs2345695	ATTTAGTTATCCTTCTCTTCTTG	ACT
rs2345696	ACACAAGTGTAACCTTCTACTCT	ACT
rs4036209	GGAAACCAGAATATGCCACC	CGT
rs2345697	AGCCAAAGGGACATATTTTGTGGT	ACT
rs2881197	GGAACACAGTGTATAAGACCAA	CGT
rs2345698	CGGTGGAACACAGTGTATAAG	ACT
rs2345699	AAAACAAGAACTCTTTTCATTGCC	ACT
rs2744640	TTTATCTCCAGTTCCCCAGC	ACG
rs2744639	AGCACTTAGTATGCCTTCTCCTT	ACT
rs2744638	TGGCAATACCACGTCAGTAAG	ACT
rs2744637	GCTGGGCTGGGTTTGGGCTG	ACT
rs2744636	ACCCGTCACACTCATATAATCCC	ACG
rs2744635	ACACATGCGTGTTCCAGGG	ACT
rs2744634	GGGATTATATGAGTGTGACGG	ACT
rs2744633	GGGTGTAGCGTTAGGTGAC	ACT
rs2744632	GCGCACATAACGCTTGGAAC	ACT
rs2744630	CGTGTTAAACTCATGGCCAAAC	ACT
rs2744629	ATAAACCACCCTGGAGTTCAT	ACT
rs2744628	TTGAAGAAAACCTTCCCTTAGCCA	ACT
rs2744627	GTTTATGTTCCACTGGCTAAG	ACT
rs2977616	TTGAGGTCAAACATTAATATCAAG	ACT

dbSNP rs#	Extend Primer	Term Mix
rs2977617	CTAGCTTCTCAATCTTTTGAGTT	CGT
rs2744626	GTGAAATTGTATTTCCGGATTTC	ACT
rs2744625	TCCTGAACACTTATCCACTTTAC	ACT
rs3115847	CCAGGGCTGGAGGGGCC	ACT
rs2744623	GGTGCTGGCGGGAGCGAGAGT	ACT
rs4036193	GACTCCGTCTCAAAAAAAAAAAAAA	ACT
rs4036194	CTTGATGTGTGCTTCAGGGTA	ACG
rs4036196	CAGTGCAAGTAAAGAGCCTTA	ACT
rs1042327	CATCACAGCTCCCCACCAT	ACT

Genetic Analysis

[0246] Allelotyping results from the discovery cohort are shown for cases and controls in Table 23. The allele frequency for the A2 allele is noted in the fifth and sixth columns for osteoarthritis case pools and control pools, respectively, where “AF” is allele frequency. The allele frequency for the A1 allele can be easily calculated by subtracting the A2 allele frequency from 1 (A1 AF = 1-A2 AF). For example, the SNP rs1474555 has the following case and control allele frequencies: case A1 (C) = 0.64; case A2 (T) = 0.36; control A1 (C) = 0.70; and control A2 (T) = 0.30, where the nucleotide is provided in paranthesis. Some SNPs are labeled “untyped” because of failed assays.

TABLE 23

dbSNP rs#	Position in SEQ ID NO: 3	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1474555	229	170689279	C/T	0.36	0.30	0.024
rs1474554	6310	170695360	A/G	0.48	0.43	0.058
rs10334	11840	170700890	G/T			
rs10541	11870	170700920	A/T			
rs3823299	12064	170701114	A/G	0.45	0.41	0.125
rs742348	13392	170702442	C/G	0.46	0.44	0.275
rs1474644	16354	170705404	A/G	0.75	0.77	0.270
rs1474643	16559	170705609	C/T	0.45	0.40	0.042
rs2056970	16935	170705985	A/G	0.36	0.33	0.242
rs2223474	17616	170706666	C/T	0.42	0.46	0.140
rs2206284	17737	170706787	C/T	0.37	0.35	0.493
rs756519	18321	170707371	C/T			
rs756518	18453	170707503	A/G	0.49	0.53	0.133
rs756517	18811	170707861	C/T			
rs1474642	20020	170709070	C/T	0.12	0.12	0.904
rs2038093	21662	170710712	C/G			
rs2038092	23197	170712247	C/G			
rs2223473	23446	170712496	G/T	0.42	0.45	0.296
rs760909	24339	170713389	G/T	0.49	0.52	0.255
rs2076319	25504	170714554	A/G	0.43	0.46	0.219
rs3778589	27174	170716224	A/G	0.49	0.54	0.081
rs3800236	28008	170717058	A/T	0.47	0.50	0.319
rs2206286	29294	170718344	C/T	0.81	0.82	0.831
rs12717	29759	170718809	C/G	0.52	0.57	0.081
rs2179373	30832	170719882	A/G	0.58	0.62	0.089
rs3800235	44512	170733562	A/C	0.60	0.64	0.077
rs3823298	44850	170733900	C/G	0.44	0.38	0.022
rs2076318	45884	170734934	A/G	0.41	0.45	0.109
rs2235506	46345	170735395	C/T	0.68	0.66	0.320
rs2072916	48589	170737639	A/G	0.48	0.51	0.192

dbSNP rs#	Position in SEQ ID NO: 3	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs3734763	53371	170742421	A/G	0.50	0.54	0.142
rs3177571	53911	170742961	G/T			
rs8770	53990	170743040	A/G			
rs3173219	55152	170744202	C/G	0.49	0.53	0.056
rs960744	55667	170744717	C/T	0.39	0.35	0.179
rs2066954	58952	170748002	A/C	0.37	0.32	0.057
rs2072917	59315	170748365	G/T	0.46	0.42	0.153
rs3173220	60029	170749079	A/G			
rs734249	61477	170750527	A/C	0.48	0.40	0.022
rs2092310	62988	170752038	C/T			
rs2092309	63090	170752140	C/G	0.43	0.47	0.165
rs1016536	64021	170753071	A/C	0.10	0.10	0.985
rs2235506	65685	170754735	C/T			
rs2076998	70220	170759270	A/G			
rs2076997	70323	170759373	A/C	0.90	0.90	0.814
rs2345478	70959	170760009	A/C	0.09	0.09	0.947
rs2021899	73436	170762486	C/G	0.46	0.43	0.218
rs2021898	82945	170771995	A/G			
rs2345682	82958	170772008	G/T			
rs2345683	82961	170772011	C/G	0.28	0.34	0.019
rs2881195	82964	170772014	C/T			
rs2345684	82965	170772015	G/T			
rs3046261	83006	170772056	-/CTTT			
rs4083413	83025	170772075	C/T			
rs4083412	83034	170772084	A/G			
rs2345685	83074	170772124	G/T	0.71	0.71	0.835
rs2021897	83132	170772182	G/T			
rs4036211	83155	170772205	C/T			
rs4036212	83172	170772222	A/T			
rs4036213	83174	170772224	G/T			
rs2345686	83206	170772256	C/T			
rs4036214	83216	170772266	G/T			
rs4036215	83234	170772284	G/T			
rs2345687	83252	170772302	A/G	0.55	0.50	0.085
rs2345688	83260	170772310	A/C	0.53	0.52	0.958
rs2881196	83263	170772313	A/C			
rs3046288	83296	170772346	-/IAT			
rs4036216	83319	170772369	A/G			
rs4036205	83322	170772372	C/G			
rs2092307	83324	170772374	A/C			
rs4036206	83357	170772407	C/G			
rs2345689	83375	170772425	C/T			
rs2345690	83381	170772431	C/T			
rs2345691	83389	170772439	A/T			
rs2345692	83443	170772493	A/G			
rs3046306	83499	170772549	-/GGTG	0.42	0.43	0.761
rs4036207	83545	170772595	C/T			
rs2345693	83566	170772616	C/T			
rs2345694	83591	170772641	C/T			
rs2345695	83619	170772669	G/T			
rs2345696	83698	170772748	A/G			
rs4036209	83780	170772830	G/T	0.79	0.73	0.156
rs2345697	83784	170772834	G/T			
rs2881197	83826	170772876	G/T			
rs2345698	83832	170772882	C/T			
rs2345699	83852	170772902	C/T			
rs2744640	86297	170775347	C/T	0.53	0.53	0.973
rs2744639	86315	170775365	G/T	0.40	0.40	0.789
rs2744638	86420	170775470	C/G	0.39	0.39	0.941
rs2744637	86460	170775510	C/G	0.40	0.42	0.497
rs2744636	86714	170775764	C/T	0.76	0.73	0.271
rs2744635	86718	170775768	C/T	0.03	0.02	0.425
rs2744634	86736	170775786	C/G	0.96	0.94	0.436
rs2744633	86753	170775803	C/T	0.14	0.16	0.409

dbSNP rs#	Position in SEQ ID NO: 3	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2744632	86766	170775816	G/T	0.80	0.83	0.217
rs2744630	88162	170777212	C/G			
rs2744629	88218	170777268	A/G	0.80	0.80	0.978
rs2744628	88246	170777296	A/G	0.71	0.67	0.206
rs2744627	88255	170777305	C/T	0.32	0.30	0.335
rs2977616	88309	170777359	G/T			
rs2977617	88310	170777360	A/T			
rs2744626	88471	170777521	A/G			
rs2744625	88619	170777669	C/T			
rs3115847	88904	170777954	C/T			
rs2744623	89044	170778094	C/G			
rs4036193	90531	170779581	-/AAAAA			
rs4036194	90534	170779584	A/G			
rs4036196	90613	170779663	C/G			
rs1042327	46252	170735302	C/T	0.45	0.39	0.028

[0247] The *Chrom 6* proximal SNPs were also allelotyped in the replication cohorts using the methods described herein and the primers provided in Tables 11 and 12. The replication allelotyping results for replication cohort #1 and replication cohort #2 are provided in Tables 24 and 25, respectively.

TABLE 24

dbSNP rs#	Position in SEQ ID NO: 3	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1474555	229	170689279	C/T	0.37	0.27	0.004
rs1474554	6310	170695360	A/G	0.50	0.42	0.020
rs10334	11840	170700890	G/T			
rs10541	11870	170700920	A/T			
rs3823299	12064	170701114	A/G	0.45	0.40	0.080
rs742348	13392	170702442	C/G	0.47	0.41	0.075
rs1474644	16354	170705404	A/G	0.75	0.79	0.231
rs1474643	16559	170705609	C/T	0.46	0.39	0.028
rs2056970	16935	170705985	A/G	0.38	0.33	0.129
rs2223474	17616	170706666	C/T	0.41	0.48	0.052
rs2206284	17737	170706787	C/T	0.37	0.34	0.342
rs756519	18321	170707371	C/T			
rs756518	18453	170707503	A/G	0.48	0.56	0.013
rs756517	18811	170707861	C/T			
rs1474642	20020	170709070	C/T	0.10	0.13	0.277
rs2038093	21662	170710712	C/G			
rs2038092	23197	170712247	C/G			
rs2223473	23446	170712496	G/T	0.42	0.48	0.070
rs760909	24339	170713389	G/T	0.47	0.54	0.077
rs2076319	25504	170714554	A/G	0.41	0.49	0.017
rs3778589	27174	170716224	A/G	0.50	0.57	0.035
rs3800236	28008	170717058	A/T	0.47	0.52	0.126
rs2206286	29294	170718344	C/T	0.80	0.80	0.952
rs12717	29759	170718809	C/G	0.53	0.59	0.059
rs2179373	30832	170719882	A/G	0.57	0.64	0.025
rs3800235	44512	170733562	A/C	0.59	0.65	0.065
rs3823298	44850	170733900	C/G	0.46	0.36	0.003
rs2076318	45884	170734934	A/G	0.40	0.47	0.017
rs2235506	46345	170735395	C/T	0.68	0.65	0.434
rs2072916	48589	170737639	A/G	0.47	0.54	0.026
rs3734763	53371	170742421	A/G	0.49	0.56	0.052
rs3177571	53911	170742961	G/T			
rs8770	53990	170743040	A/G			
rs3173219	55152	170744202	C/G	0.49	0.55	0.069
rs960744	55667	170744717	C/T	0.39	0.34	0.131

dbSNP rs#	Position in SEQ ID NO: 3	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2066954	58952	170748002	A/C	0.36	0.31	0.096
rs2072917	59315	170748365	G/T	0.46	0.41	0.070
rs3173220	60029	170749079	A/G			
rs734249	61477	170750527	A/C	0.37	NA	0.484
rs2092310	62988	170752038	C/T			
rs2092309	63090	170752140	C/G	0.43	0.49	0.102
rs1016536	64021	170753071	A/C	0.08	0.11	0.277
rs2235506	65685	170754735	C/T			
rs2076998	70220	170759270	A/G			
rs2076997	70323	170759373	A/C	0.89	0.91	0.655
rs2345478	70959	170760009	A/C	0.08	0.09	0.660
rs2021899	73436	170762486	C/G	0.48	0.42	0.081
rs2021898	82945	170771995	A/G			
rs2345682	82958	170772008	G/T			
rs2345683	82961	170772011	C/G	0.32	0.39	0.046
rs2881195	82964	170772014	C/T			
rs2345684	82965	170772015	G/T			
rs3046261	83006	170772056	-/CTTT			
rs4083413	83025	170772075	C/T			
rs4083412	83034	170772084	A/G			
rs2345685	83074	170772124	G/T	0.69	0.70	0.772
rs2021897	83132	170772182	G/T			
rs4036211	83155	170772205	C/T			
rs4036212	83172	170772222	A/T			
rs4036213	83174	170772224	G/T			
rs2345686	83206	170772256	C/T			
rs4036214	83216	170772266	G/T			
rs4036215	83234	170772284	G/T			
rs2345687	83252	170772302	A/G	0.62	NA	NA
rs2345688	83260	170772310	A/C	0.46	0.49	0.383
rs2881196	83263	170772313	A/C			
rs3046288	83296	170772346	-/AT			
rs4036216	83319	170772369	A/G			
rs4036205	83322	170772372	C/G			
rs2092307	83324	170772374	A/C			
rs4036206	83357	170772407	C/G			
rs2345689	83375	170772425	C/T			
rs2345690	83381	170772431	C/T			
rs2345691	83389	170772439	A/T			
rs2345692	83443	170772493	A/G			
rs3046306	83499	170772549	-/GGTG	0.39	0.40	0.729
rs4036207	83545	170772595	C/T			
rs2345693	83566	170772616	C/T			
rs2345694	83591	170772641	C/T			
rs2345695	83619	170772669	G/T			
rs2345696	83698	170772748	A/G			
rs4036209	83780	170772830	G/T	0.79	0.73	0.156
rs2345697	83784	170772834	G/T			
rs2881197	83826	170772876	G/T			
rs2345698	83832	170772882	C/T			
rs2345699	83852	170772902	C/T			
rs2744640	86297	170775347	C/T	0.49	0.51	0.583
rs2744639	86315	170775365	G/T	0.45	0.43	0.745
rs2744638	86420	170775470	C/G	0.38	0.38	0.852
rs2744637	86460	170775510	C/G	0.35	0.40	0.216
rs2744636	86714	170775764	C/T	0.71	0.73	0.482
rs2744635	86718	170775768	C/T	0.05	0.03	0.195
rs2744634	86736	170775786	C/G	0.93	0.92	0.601
rs2744633	86753	170775803	C/T	0.19	0.20	0.681
rs2744632	86766	170775816	G/T	0.85	0.90	0.070
rs2744630	88162	170777212	C/G			
rs2744629	88218	170777268	A/G	0.78	0.79	0.891
rs2744628	88246	170777296	A/G	0.68	0.67	0.766
rs2744627	88255	170777305	C/T	0.32	0.30	0.636

dbSNP rs#	Position in SEQ ID NO: 3	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2977616	88309	170777359	G/T			
rs2977617	88310	170777360	A/T			
rs2744626	88471	170777521	A/G			
rs2744625	88619	170777669	C/T			
rs3115847	88904	170777954	C/T			
rs2744623	89044	170778094	C/G			
rs4036193	90531	170779581	-/AAAAA			
rs4036194	90534	170779584	A/G			
rs4036196	90613	170779663	C/G			
rs1042327	46252	170735302	C/T	0.46	0.37	0.004

TABLE 25

dbSNP rs#	Position in SEQ ID NO: 3	Chromosom e Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1474555	229	170689279	C/T	0.35	0.36	0.770
rs1474554	6310	170695360	A/G	0.45	0.44	0.873
rs10334	11840	170700890	G/T			
rs10541	11870	170700920	A/T			
rs3823299	12064	170701114	A/G	untyped	0.43	NA
rs742348	13392	170702442	C/G	0.45	0.47	0.600
rs1474644	16354	170705404	A/G	0.74	0.75	0.775
rs1474643	16559	170705609	C/T	0.43	0.41	0.614
rs2056970	16935	170705985	A/G	0.33	0.33	0.978
rs2223474	17616	170706666	C/T	0.44	0.43	0.944
rs2206284	17737	170706787	C/T	0.36	0.37	0.901
rs756519	18321	170707371	C/T			
rs756518	18453	170707503	A/G	0.50	0.47	0.453
rs756517	18811	170707861	C/T			
rs1474642	20020	170709070	C/T	0.15	0.11	0.147
rs2038093	21662	170710712	C/G			
rs2038092	23197	170712247	C/G			
rs2223473	23446	170712496	G/T	0.43	0.40	0.408
rs760909	24339	170713389	G/T	0.51	0.48	0.506
rs2076319	25504	170714554	A/G	0.44	0.40	0.264
rs3778589	27174	170716224	A/G	0.49	0.48	0.910
rs3800236	28008	170717058	A/T	0.48	0.46	0.670
rs2206286	29294	170718344	C/T	0.83	0.84	0.685
rs12717	29759	170718809	C/G	0.51	0.53	0.726
rs2179373	30832	170719882	A/G	0.59	0.58	0.880
rs3800235	44512	170733562	A/C	0.60	0.62	0.632
rs3823298	44850	170733900	C/G	0.41	0.41	0.945
rs2076318	45884	170734934	A/G	0.43	0.42	0.636
rs2235506	46345	170735395	C/T	0.69	0.67	0.594
rs2072916	48589	170737639	A/G	0.49	0.46	0.399
rs3734763	53371	170742421	A/G	0.51	0.51	0.888
rs3177571	53911	170742961	G/T			
rs8770	53990	170743040	A/G			
rs3173219	55152	170744202	C/G	0.48	0.51	0.493
rs960744	55667	170744717	C/T	0.38	0.37	0.738
rs2066954	58952	170748002	A/C	0.37	0.34	0.378
rs2072917	59315	170748365	G/T	0.45	0.45	0.982
rs3173220	60029	170749079	A/G			
rs734249	61477	170750527	A/C	0.46	0.02	
rs2092310	62988	170752038	C/T			
rs2092309	63090	170752140	C/G	0.43	0.44	0.891
rs1016536	64021	170753071	A/C	0.13	0.09	0.173
rs2235506	65685	170754735	C/T			
rs2076998	70220	170759270	A/G			
rs2076997	70323	170759373	A/C	0.92	0.89	0.256
rs2345478	70959	170760009	A/C	0.11	0.10	0.545
rs2021899	73436	170762486	C/G	0.44	0.45	0.797

dbSNP rs#	Position in SEQ ID NO: 3	Chromosom e Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2021898	82945	170771995	A/G			
rs2345682	82958	170772008	G/T			
rs2345683	82961	170772011	C/G	0.23	0.26	0.407
rs2881195	82964	170772014	C/T			
rs2345684	82965	170772015	G/T			
rs3046261	83006	170772056	-/CTTT			
rs4083413	83025	170772075	C/T			
rs4083412	83034	170772084	A/G			
rs2345685	83074	170772124	G/T	0.74	0.71	0.533
rs2021897	83132	170772182	G/T			
rs4036211	83155	170772205	C/T			
rs4036212	83172	170772222	A/T			
rs4036213	83174	170772224	G/T			
rs2345686	83206	170772256	C/T			
rs4036214	83216	170772266	G/T			
rs4036215	83234	170772284	G/T			
rs2345687	83252	170772302	A/G	0.47	0.50	0.457
rs2345688	83260	170772310	A/C	0.61	0.58	0.434
rs2881196	83263	170772313	A/C			
rs3046288	83296	170772346	-/IAT			
rs4036216	83319	170772369	A/G			
rs4036205	83322	170772372	C/G			
rs2092307	83324	170772374	A/C			
rs4036206	83357	170772407	C/G			
rs2345689	83375	170772425	C/T			
rs2345690	83381	170772431	C/T			
rs2345691	83389	170772439	A/T			
rs2345692	83443	170772493	A/G			
rs3046306	83499	170772549	-/GGTG			
rs4036207	83545	170772595	C/T			
rs2345693	83566	170772616	C/T			
rs2345694	83591	170772641	C/T			
rs2345695	83619	170772669	G/T			
rs2345696	83698	170772748	A/G			
rs4036209	83780	170772830	G/T			
rs2345697	83784	170772834	G/T			
rs2881197	83826	170772876	G/T			
rs2345698	83832	170772882	C/T			
rs2345699	83852	170772902	C/T			
rs2744640	86297	170775347	C/T	0.57	0.55	0.595
rs2744639	86315	170775365	G/T	0.35	0.34	0.752
rs2744638	86420	170775470	C/G	0.41	0.40	0.793
rs2744637	86460	170775510	C/G	0.47	0.46	0.836
rs2744636	86714	170775764	C/T	0.83	NA	
rs2744635	86718	170775768	C/T			
rs2744634	86736	170775786	C/G	untyped	0.97	NA
rs2744633	86753	170775803	C/T	0.09	0.10	0.691
rs2744632	86766	170775816	G/T	0.74	0.72	0.529
rs2744630	88162	170777212	C/G			
rs2744629	88218	170777268	A/G	0.81	0.81	0.959
rs2744628	88246	170777296	A/G	0.74	NA	
rs2744627	88255	170777305	C/T	0.33	0.29	0.341
rs2977616	88309	170777359	G/T			
rs2977617	88310	170777360	A/T			
rs2744626	88471	170777521	A/G			
rs2744625	88619	170777669	C/T			
rs3115847	88904	170777954	C/T			
rs2744623	89044	170778094	C/G			
rs4036193	90531	170779581	-/AAAAA			
rs4036194	90534	170779584	A/G			
rs4036196	90613	170779663	C/G			
rs1042327	46252	170735302	C/T	0.42	0.43	0.880

[0248] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 1C for the discovery cohort. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 1C can be determined by consulting Table 23. For example, the left-most X on the left graph is at position 170689279. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0249] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The generally bottom-most curve is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0250] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is placed at the 3' end of each gene to show the direction of transcription.

Example 7

ELP3 Region Proximal SNPs

[0251] It has been discovered that SNP rs1563055 in elongation protein 3 homolog (*ELP3*) is associated with occurrence of osteoarthritis in subjects.

[0252] Thirty-three additional allelic variants proximal to rs1563055 were identified and subsequently allelotyped in osteoarthritis case and control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 26. The chromosome positions provided in column four of Table 26 are based on Genome "Build 34" of NCBI's GenBank.

TABLE 26

dbSNP rs#	Chromosome	Position in SEQ ID NO: 4	Chromosome Position	Allele Variants
rs1000658	8	211	27927511	c/t

dbSNP rs#	Chromosome	Position in SEQ ID NO: 4	Chromosome Position	Allele Variants
rs1984880	8	473	27927773	c/t
rs999112	8	1536	27928836	c/t
rs735880	8	5639	27932939	c/t
rs2045029	8	17186	27944486	a/g
rs2045028	8	17335	27944635	c/t
rs1947384	8	25029	27952329	c/g
rs1947385	8	25111	27952411	c/t
rs1901744	8	28811	27956111	a/g
rs1901745	8	28863	27956163	a/t
rs971882	8	30809	27958109	a/c
rs1377338	8	40985	27968285	a/c
rs2305452	8	45147	27972447	c/t
rs2305451	8	45282	27972582	a/g
rs2123472	8	46168	27973468	g/t
rs2167768	8	46328	27973628	a/g
rs1563055	8	49077	27976377	a/g
rs2290371	8	51925	27979225	c/t
rs2290370	8	52141	27979441	a/g
rs2290369	8	52168	27979468	c/t
rs2874904	8	60852	27988152	c/t
rs3213997	8	62468	27989768	a/g
rs3213998	8	65572	27992872	g/t
rs1530929	8	79089	28006389	a/c
rs1000275	8	79541	28006841	c/t
rs1000274	8	79790	28007090	c/t
rs3757896	8	90843	28018143	a/g
rs3757895	8	90978	28018278	c/t
rs3757894	8	91052	28018352	c/g
rs3757893	8	91131	28018431	a/g
rs3757892	8	91132	28018432	c/t
rs3757891	8	94439	28021739	a/g
rs3757890	8	94621	28021921	a/t

Assay for Verifying and Allelotyping SNPs

[0253] The methods used to verify and allelotype the 33 proximal SNPs of Table 26 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 27 and Table 28, respectively.

TABLE 27

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs1000658	ACGTTGGATGTTCTCAAAAAAGAAACACAT	ACGTTGGATGGGGTTATCAGTTTGAGATTC
rs1984880	ACGTTGGATGCCATTTGCCAATTCCTGTGG	ACGTTGGATGATGGGCTGAAATGTATCCCC
rs999112	ACGTTGGATGCTAAGCACATGCCTTTCTTG	ACGTTGGATGCTATTTTCTACTGGGAGATG
rs735880	ACGTTGGATGTGCCTTCATTCTCCAACCAC	ACGTTGGATGAACAGAGTGAGACCCATCTG
rs2045029	ACGTTGGATGAGTCATTGCTAGCTTTCTGG	ACGTTGGATGGGGACTTTAGGGAAGTTATAG
rs2045028	ACGTTGGATGAGCTTGCTAGTGAGCCGAGAT	ACGTTGGATGTGAGACAGAGTCTTGCTCTG
rs1947384	ACGTTGGATGATTCTCCACCGAGAAACCAG	ACGTTGGATGTTGTGGCAGCAAGAAGGAAC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs1947385	ACGTTGGATGAAATTTCAACAGTCAACAAT	ACGTTGGATGGTCAGTTTTGAAACTGATC
rs1901744	ACGTTGGATGCCTTGATTGAAGAGTAAAGC	ACGTTGGATGATCAAATATTCCTCATCCCC
rs1901745	ACGTTGGATGCTTCTGCCTTTACCTGTGTC	ACGTTGGATGAAATGAAGCAGCACTCACAG
rs971882	ACGTTGGATGAAGCCCTAATCATTGGTACG	ACGTTGGATGGATGGGTGCTAAAAAGACAC
rs1377338	ACGTTGGATGCCCACATATCTACACATCAAG	ACGTTGGATGAGGGAGATAGGTGGTTAAAG
rs2305452	ACGTTGGATGCCGTGTTGCAACTAACAGGG	ACGTTGGATGAGACGTTCCCATCCTCCATC
rs2305451	ACGTTGGATGGCAGAGCCACCAGAGATAAA	ACGTTGGATGTTTTACGACAGGCGGGATTG
rs2123472	ACGTTGGATGCACTTAGAATTGTTGCTTGG	ACGTTGGATGGCTGTATCTGTGACCTCAA
rs2167768	ACGTTGGATGGAATCAACATGACTTGGTGAC	ACGTTGGATGATCTCACTCTAACTTGCTCC
rs1563055	ACGTTGGATGAGTTCTTTCTCCTCACATTG	ACGTTGGATGCCCTTTAGAAGCACATACTC
rs2290371	ACGTTGGATGATCCTCTTGGTAGCTTGTCC	ACGTTGGATGCTGTCTTGGTTTTCCACCTG
rs2290370	ACGTTGGATGCAACCTCTACCTCACTACAC	ACGTTGGATGATGAGGTATCGACACACTGG
rs2290369	ACGTTGGATGACACACTGGGTATCTGTTCT	ACGTTGGATGTCAGAATCCCCAACCTCTAC
rs2874904	ACGTTGGATGAAATTCCAGGCTGGGTACAG	ACGTTGGATGTGCTGACCTTAAGTGATCCG
rs3213997	ACGTTGGATGGGTTGGCTAGAAGAGAAAAA	ACGTTGGATGTACAGTCCTTTTGAAACTAC
rs3213998	ACGTTGGATGACAGTTTGTGACATAGTAG	ACGTTGGATGAGGCTGAAAAGACATTTCATG
rs1530929	ACGTTGGATGGGCTTTCACTATATTTCTC	ACGTTGGATGGAATACAGTAAGCCTATGGG
rs1000275	ACGTTGGATGAACCCAGAAAGCAAAAAGC	ACGTTGGATGCACGCTTGCTAACTTAATGG
rs1000274	ACGTTGGATGGCCTAAGACAGGATCCAAAC	ACGTTGGATGTTACTGCGTGCCTTAGTACC
rs3757896	ACGTTGGATGCCTTCAAGCAAGTCAGTTAC	ACGTTGGATGCAGAACTGTGTGACTGATC
rs3757895	ACGTTGGATGAAAATCATTGGCCAAACTGC	ACGTTGGATGCTCCTTAGTATTCTTAGGTG
rs3757894	ACGTTGGATGAGAAGGGTTGAACAACAAGG	ACGTTGGATGCACCTAAGAATACTAAGGAG
rs3757893	ACGTTGGATGCCCTTGTGTTCAACCCTTC	ACGTTGGATGCTGCATGTGGATACCTACAC
rs3757892	ACGTTGGATGTCCTGCATGTGGATACCTAC	ACGTTGGATGCCCTTGTGTTCAACCCTTC
rs3757891	ACGTTGGATGATGGGCCAATTCTCCATAGG	ACGTTGGATGAGGCCTGTTAAGGAAACCTG
rs3757890	ACGTTGGATGCAGGTGGATGTAGGCTTAAG	ACGTTGGATGGCACCCTGCCTCTTGTGTTT

TABLE 28

dbSNP rs#	Extend Primer	Term Mix
rs1000658	AATTGACAATGTTGGGACTGTT	ACG
rs1984880	TGTGGTGTAATAGGAGTTAGTGG	ACT
rs999112	GCACATGCCTTTCTTGGAAGT	ACG
rs735880	AACCTTTACTTGTACTACATGC	ACG
rs2045029	GCTAGCTTTCTGGTAATGAAAAT	ACT
rs2045028	GATCGCACCACTGCACTCCAG	ACG
rs1947384	ATAGCGGCAGTCCAAAAAGC	ACT
rs1947385	TTCAACAGTCAACAATGAAACC	ACT
rs1901744	ATAGTCAAGTATGCAAATGAAGC	ACT
rs1901745	CCTTTACCTGTGTCTTCCCT	CGT
rs971882	CCTAATCATTGGTACGGTCTCA	ACT
rs1377338	AGTATTAGCTCAAATATCACATTG	ACT
rs2305452	CAGGGTAGCAGGCGGCC	ACG
rs2305451	CCACAACTCAGACCACGG	ACT
rs2123472	CAGTTAATGTCAAGAAGCATAG	ACT
rs2167768	ACATGACTTGGTGACAGAAGAA	ACT
rs1563055	TTCTCCTCACATTGTTTCTACT	ACG
rs2290371	GGTAGCTTGTCTTAAATAACCGT	ACT
rs2290370	GGAGCAGGGACTTCTGCCA	ACT

dbSNP rs#	Extend Primer	Term Mix
rs2290369	AGTCCCTGCTCCATGTGAC	ACT
rs2874904	GGCTAACGCCTGTAATCCCA	ACT
rs3213997	AGAAAAATATTGTTATGCCCACA	ACG
rs3213998	TAGTATTCTCAAATAGAGAGATTTC	ACT
rs1530929	TTTCCTCTTTCCAGAATTGTATTT	ACT
rs1000275	ATGAGAATATCCTAGAATGAGGCA	ACG
rs1000274	GAATCATCAGGTCCTGTGCC	ACG
rs3757896	TAATTCTCCTTAAGTAGTTAATTC	ACT
rs3757895	TTGGCCAAACTGCAGGATCT	ACT
rs3757894	AAGGGCCACACAAGCAATTTCAA	ACT
rs3757893	CCAAAGGACATTAGGTGGTG	ACG
rs3757892	TGTGGATACCTACACTGCTC	ACG
rs3757891	AGGATAAGTGTAACGGGGTC	ACT
rs3757890	AGTGACACTCTTACTTCACAC	CGT

Genetic Analysis

[0254] Allelotyping results from the discovery cohort are shown for cases and controls in Table 29. The allele frequency for the A2 allele is noted in the fifth and sixth columns for osteoarthritis case pools and control pools, respectively, where “AF” is allele frequency. The allele frequency for the A1 allele can be easily calculated by subtracting the A2 allele frequency from 1 (A1 AF = 1-A2 AF). For example, the SNP rs1000658 has the following case and control allele frequencies: case A1 (C) = 0.36; case A2 (T) = 0.64; control A1 (C) = 0.37; and control A2 (T) = 0.63, where the nucleotide is provided in paranthesis. Some SNPs are labeled “untyped” because of failed assays.

TABLE 29

dbSNP rs#	Position in SEQ ID NO: 4	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1000658	211	27927511	C/T	0.79	0.80	0.591
rs1984880	473	27927773	C/T	0.47	0.48	0.735
rs999112	1536	27928836	C/T	0.72	0.72	0.775
rs735880	5639	27932939	C/T	0.20	0.19	0.561
rs2045029	17186	27944486	A/G	0.54	0.56	0.361
rs2045028	17335	27944635	C/T			
rs1947384	25029	27952329	C/G	0.63	0.60	0.122
rs1947385	25111	27952411	C/T			
rs1901744	28811	27956111	A/G	0.18	0.18	0.796
rs1901745	28863	27956163	A/T	0.14	0.18	0.117
rs971882	30809	27958109	A/C			
rs1377338	40985	27968285	A/C	0.28	0.24	0.085
rs2305452	45147	27972447	C/T	0.31	0.27	0.078
rs2305451	45282	27972582	A/G	0.48	0.52	0.130
rs2123472	46168	27973468	G/T	0.42	0.45	0.239
rs2167768	46328	27973628	A/G	0.38	0.35	0.350
rs1563055	49077	27976377	A/G			
rs2290371	51925	27979225	C/T	0.28	0.24	0.039
rs2290370	52141	27979441	A/G	0.85	0.84	0.551
rs2290369	52168	27979468	C/T	0.43	0.47	0.138
rs2874904	60852	27988152	C/T	0.26	0.23	0.132
rs3213997	62468	27989768	A/G	0.44	0.47	0.201
rs3213998	65572	27992872	G/T	0.83	0.80	0.223

dbSNP rs#	Position in SEQ ID NO: 4	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1530929	79089	28006389	A/C	0.47	0.49	0.556
rs1000275	79541	28006841	C/T	0.86	0.87	0.771
rs1000274	79790	28007090	C/T	0.54	0.56	0.510
rs3757896	90843	28018143	A/G			
rs3757895	90978	28018278	C/T	0.46	0.47	0.874
rs3757894	91052	28018352	C/G	0.08	0.09	0.709
rs3757893	91131	28018431	A/G	0.16	0.15	0.590
rs3757892	91132	28018432	C/T	0.09	0.08	0.595
rs3757891	94439	28021739	A/G			
rs3757890	94621	28021921	A/T	0.98	0.96	0.167

[0255] The *ELP3* proximal SNPs were also allelotyped in the replication cohorts using the methods described herein and the primers provided in Tables 27 and 28. The replication allelotyping results for replication cohort #1 and replication cohort #2 are provided in Tables 30 and 31, respectively.

TABLE 30

dbSNP rs#	Position in SEQ ID NO: 4	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1000658	211	27927511	C/T	0.78	0.79	0.863
rs1984880	473	27927773	C/T	0.46	0.48	0.594
rs999112	1536	27928836	C/T	0.71	0.70	0.759
rs735880	5639	27932939	C/T	0.20	0.17	0.255
rs2045029	17186	27944486	A/G	0.55	0.57	0.526
rs2045028	17335	27944635	C/T			
rs1947384	25029	27952329	C/G	0.65	0.61	0.198
rs1947385	25111	27952411	C/T			
rs1901744	28811	27956111	A/G	0.19	0.18	0.674
rs1901745	28863	27956163	A/T	0.15	0.18	0.448
rs971882	30809	27958109	A/C			
rs1377338	40985	27968285	A/C	0.29	0.22	0.039
rs2305452	45147	27972447	C/T	0.31	0.26	0.067
rs2305451	45282	27972582	A/G	0.49	0.56	0.063
rs2123472	46168	27973468	G/T	0.42	0.49	0.039
rs2167768	46328	27973628	A/G	0.36	0.34	0.396
rs1563055	49077	27976377	A/G			
rs2290371	51925	27979225	C/T	0.28	0.23	0.054
rs2290370	52141	27979441	A/G	0.85	0.83	0.488
rs2290369	52168	27979468	C/T	0.41	0.49	0.036
rs2874904	60852	27988152	C/T	0.29	0.22	0.062
rs3213997	62468	27989768	A/G	0.44	0.50	0.064
rs3213998	65572	27992872	G/T	0.84	0.82	0.336
rs1530929	79089	28006389	A/C	0.48	0.52	0.311
rs1000275	79541	28006841	C/T	0.86	0.87	0.566
rs1000274	79790	28007090	C/T	0.54	0.59	0.159
rs3757896	90843	28018143	A/G			
rs3757895	90978	28018278	C/T	0.45	0.49	0.308
rs3757894	91052	28018352	C/G	0.09	0.09	0.914
rs3757893	91131	28018431	A/G	0.15	0.14	0.803
rs3757892	91132	28018432	C/T	0.09	0.08	0.798
rs3757891	94439	28021739	A/G			
rs3757890	94621	28021921	A/T	0.98	0.95	0.159

TABLE 31

dbSNP rs#	Position in SEQ ID NO: 4	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1000658	211	27927511	C/T	0.80	0.82	0.443
rs1984880	473	27927773	C/T	0.48	0.47	0.898

dbSNP rs#	Position in SEQ ID NO: 4	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs999112	1536	27928836	C/T	0.72	0.76	0.319
rs735880	5639	27932939	C/T	0.20	0.22	0.598
rs2045029	17186	27944486	A/G	0.52	0.54	0.581
rs2045028	17335	27944635	C/T			
rs1947384	25029	27952329	C/G	0.62	0.59	0.348
rs1947385	25111	27952411	C/T			
rs1901744	28811	27956111	A/G	0.18	0.18	0.928
rs1901745	28863	27956163	A/T	0.13	0.17	0.113
rs971882	30809	27958109	A/C			
rs1377338	40985	27968285	A/C	0.27	0.27	0.961
rs2305452	45147	27972447	C/T	0.32	0.30	0.673
rs2305451	45282	27972582	A/G	0.47	0.47	0.911
rs2123472	46168	27973468	G/T	0.41	0.38	0.348
rs2167768	46328	27973628	A/G	0.39	0.37	0.664
rs1563055	49077	27976377	A/G			
rs2290371	51925	27979225	C/T	0.28	0.25	0.403
rs2290370	52141	27979441	A/G	0.85	0.84	0.939
rs2290369	52168	27979468	C/T	0.46	0.44	0.712
rs2874904	60852	27988152	C/T	0.24	0.24	0.888
rs3213997	62468	27989768	A/G	0.45	0.43	0.752
rs3213998	65572	27992872	G/T	0.81	0.78	0.373
rs1530929	79089	28006389	A/C	0.46	0.43	0.445
rs1000275	79541	28006841	C/T	0.87	0.86	0.767
rs1000274	79790	28007090	C/T	0.54	0.51	0.394
rs3757896	90843	28018143	A/G			
rs3757895	90978	28018278	C/T	0.47	0.42	0.202
rs3757894	91052	28018352	C/G	0.07	0.09	0.478
rs3757893	91131	28018431	A/G	0.17	0.16	0.653
rs3757892	91132	28018432	C/T	0.09	0.07	0.567
rs3757891	94439	28021739	A/G			
rs3757890	94621	28021921	A/T	0.97	0.97	0.728

[0256] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 1D for the discovery cohort. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 1D can be determined by consulting Table 29. For example, the left-most X on the left graph is at position 27927511. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0257] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The generally bottom-most curve is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square

goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0258] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is placed at the 3' end of each gene to show the direction of transcription.

Example 8

LRCHI Region Proximal SNPs

[0259] It has been discovered that SNP rs912428 in leucine-rich repeats and calponin homology (CH) domain containing 1 (*LRCHI*) is associated with occurrence of osteoarthritis in subjects.

[0260] Forty-three additional allelic variants proximal to rs912428 were identified and subsequently allelotyped in osteoarthritis case and control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 32. The chromosome positions provided in column four of Table 32 are based on Genome "Build 34" of NCBI's GenBank.

TABLE 32

dbSNP rs#	Chromosome	Position in SEQ ID NO: 5	Chromosome Position	Allele Variants
rs1012628	13	243	44917643	c/t
rs1570976	13	10208	44927608	c/t
rs912436	13	15049	44932449	c/t
rs912435	13	15111	44932511	a/g
rs912433	13	15272	44932672	c/t
rs912432	13	15287	44932687	a/g
rs912431	13	15326	44932726	a/g
rs912430	13	15327	44932727	c/t
rs1408225	13	17038	44934438	c/t
rs998657	13	19391	44936791	a/g
rs1324006	13	21702	44939102	c/t
rs1924417	13	22431	44939831	c/g
rs2038728	13	22881	44940281	a/g
rs912429	13	27744	44945144	a/t
rs3742269	13	32564	44949964	a/g
rs3742270	13	32698	44950098	a/c
rs3803192	13	33104	44950504	g/t
rs3803191	13	33181	44950581	c/t
rs754106	13	33256	44950656	c/t
rs2005053	13	33543	44950943	c/t
rs1535793	13	35567	44952967	c/t
rs1886220	13	40085	44957485	c/t
rs1886219	13	40482	44957882	a/t
rs1535792	13	45641	44963041	a/t
rs1535791	13	46059	44963459	a/g
rs912428	13	48504	44965904	c/t
rs1886218	13	48919	44966319	a/c

dbSNP rs#	Chromosome	Position in SEQ ID NO: 5	Chromosome Position	Allele Variants
rs1570622	13	49693	44967093	c/t
rs912427	13	49874	44967274	a/g
rs912426	13	50020	44967420	a/g
rs3068693	13	50616	44968016	-/ttt
rs1570621	13	50719	44968119	a/g
rs1886965	13	55511	44972911	c/t
rs1008849	13	65533	44982933	a/g
rs912434	13	70529	44987929	a/c
rs3889095	13	75591	44992991	c/t
rs716223	13	77266	44994666	g/t
rs2897207	13	80368	44997768	g/t
rs1570620	13	82475	44999875	a/g
rs1467605	13	92462	45009862	g/t
rs1467604	13	92480	45009880	c/t
rs1408224	13	95819	45013219	c/t
rs1408223	13	96275	45013675	c/t

Assay for Verifying and Allelotyping SNPs

[0261] The methods used to verify and allelotype the 43 proximal SNPs of Table 32 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 33 and Table 34, respectively.

TABLE 33

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs1012628	ACGTTGGATGGATTTTCTGTGTCCCCCAAG	ACGTTGGATGTTGCAACAGAGAGAGCTCTG
rs1570976	ACGTTGGATGTGATGTGTCTGCTGTGTTGG	ACGTTGGATGTTTACATGGCGAGGTCTTAG
rs912436	ACGTTGGATGCCATATAAGGTGGTTATGGG	ACGTTGGATGCAAACAGGTTTTTCTGAGGC
rs912435	ACGTTGGATGCAAGCCAATATCCAAGACAG	ACGTTGGATGAAAAACCTGTTTGTGAGGCC
rs912433	ACGTTGGATGTGCCTTCCATCCTTAACACG	ACGTTGGATGGGCTTGAGCTTAGATATGGC
rs912432	ACGTTGGATGAAATAGTTGGGTTTTGTGCC	ACGTTGGATGATTTGGTGTTAATTGCAGTG
rs912431	ACGTTGGATGTGGAAGGCACAAAACCCAAC	ACGTTGGATGCAGAAGCTAGGCTTCCTATG
rs912430	ACGTTGGATGTGGAAGGCACAAAACCCAAC	ACGTTGGATGCAGAAGCTAGGCTTCCTATG
rs1408225	ACGTTGGATGGGGCACCATGACAATATTCC	ACGTTGGATGACACCTTGATCTTGGACTTC
rs998657	ACGTTGGATGACTGGGCCAGGGAGGAATAG	ACGTTGGATGGTTGGGGAGATAATACAGAAG
rs1324006	ACGTTGGATGGCTGAAAACCCAAATGTGTG	ACGTTGGATGCCAGCTATCAGCTCCATTTC
rs1924417	ACGTTGGATGACAAAAGCAAGCCTTCACAG	ACGTTGGATGGTACTGTAAAAGGTACTGTG
rs2038728	ACGTTGGATGAAGGCTTTTGGACACAAGTC	ACGTTGGATGGCACCTCTTATGATGTTCCC
rs912429	ACGTTGGATGTTCAATTCCCCAAAGCCCTC	ACGTTGGATGGGCAAGTTCCATAACCTCTC
rs3742269	ACGTTGGATGGAGAAAAGAGAACGAGAAGG	ACGTTGGATGTAAATGACAGCAGTCTGGAG
rs3742270	ACGTTGGATGCTAAAACCAAAGCTGACGGG	ACGTTGGATGTTCTGCTCCTGTGGCATAGC
rs3803192	ACGTTGGATGTCCTTTTGCTTCTGCGATGC	ACGTTGGATGTGCTTCCCCATCAGTTCTTG
rs3803191	ACGTTGGATGCTGTCTGTACATTACCAGGC	ACGTTGGATGAATAGCAGCTGGAGGATCTC
rs754106	ACGTTGGATGTTCTTACCATCCAGCAAGGC	ACGTTGGATGGCCTGGTAATGTACAGACAG
rs2005053	ACGTTGGATGCTGTTGCTAGCTTGGATTTG	ACGTTGGATGTTCCCTGTCCTTTCTGGCAT
rs1535793	ACGTTGGATGAACAAAGAGGAACAGAGCCC	ACGTTGGATGGCATAAGCCCCCTTTTCCTAG
rs1886220	ACGTTGGATGTCACCGTGTTAGCGAGAATG	ACGTTGGATGTAATCCCAGCACTTTGGGAG
rs1886219	ACGTTGGATGTGTAAGTGGATTTGCTGGAG	ACGTTGGATGTACATCAATAGCCGAGGAAG

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs1535792	ACGTTGGATGCTGTATATCAGTGACTGTCC	ACGTTGGATGCAGAGAAGAAACATCTCAGC
rs1535791	ACGTTGGATGGAGGGTTTATCCTTACAATTG	ACGTTGGATGTTTTAGGGTCCCTTGATAAG
rs912428	ACGTTGGATGACTACATCCATTCCAGGGAG	ACGTTGGATGTCAGATCAGAGTGAGTTTAG
rs1886218	ACGTTGGATGTCCCGAAAACAAGTCAAGAC	ACGTTGGATGAGTCCAGGCAAAACAGTAAG
rs1570622	ACGTTGGATGATAGCTGCCACACTCTTTAG	ACGTTGGATGGCGCAGTTTAGAAAAACCTG
rs912427	ACGTTGGATGTAGGGTTCTCGATGGGTATG	ACGTTGGATGTTTGCCCTGGTCACTTTAGG
rs912426	ACGTTGGATGTTAGAGGATGCATAGGCCAG	ACGTTGGATGAAGTCACTTACTGCATGGTC
rs3068693	ACGTTGGATGAAATTGGCCACATGGAATCC	ACGTTGGATGCTACCTTTAACATCCCTGTC
rs1570621	ACGTTGGATGAATTAAGAATGGCAGCTATG	ACGTTGGATGGTTTAAAACTAAAAACAC
rs1886965	ACGTTGGATGCTGCTAAGGATATGTGTTTCC	ACGTTGGATGACACCAGTGCTCAGTATTTG
rs1008849	ACGTTGGATGGCAGTTGTGAATTGTGCAGC	ACGTTGGATGTGGTGCAGAACATGTCAGAC
rs912434	ACGTTGGATGTTCTGACATGTACAGACGTG	ACGTTGGATGTCCTGGGAAATCTTTCCATC
rs3889095	ACGTTGGATGAAGGTAATGATATGTCCCCC	ACGTTGGATGCGCATTTTACAGAGACATTG
rs716223	ACGTTGGATGACACTGTCTCTAGAAGCAGG	ACGTTGGATGGAAGCAGGAAAAGAGTGAGG
rs2897207	ACGTTGGATGTCAGCCTCCAGAACTATGAG	ACGTTGGATGAACAGAGAGAGACCCTGTCT
rs1570620	ACGTTGGATGCTGTTCTGCCTTGATATGG	ACGTTGGATGGAAGGAAGTCTATTCAGCCC
rs1467605	ACGTTGGATGATGTTACAGGGTGGTAAGCG	ACGTTGGATGTAAAGTTGCCACGCTTCTCC
rs1467604	ACGTTGGATGATATACGGCATGTTACAGGG	ACGTTGGATGTTAAAGTTGCCACGCTTCTC
rs1408224	ACGTTGGATGACTTCCCCTCCTCTAGACA	ACGTTGGATGTATTGGCTGGGTAGCACTCC
rs1408223	ACGTTGGATGTCATTACCAGTTCCACAGAG	ACGTTGGATGTTGAGACATCATGAGGAGTG

TABLE 34

dbSNP rs#	Extend Primer	Term Mix
rs1012628	CTGTGTCCCCCAAGTCTTTG	ACG
rs1570976	TTGGCATTTCCTTTGAGAA	ACT
rs912436	AGGTGGTTATGGGTTTGTCACCTCA	ACT
rs912435	TCCAAAAAGCCCAAGAAATTCT	ACT
rs912433	CCTTAACACGTTTATAATAGATTA	ACG
rs912432	GTGCCTTCCATCCTTAACAC	ACT
rs912431	GGCACAAAACCCAACTATTTTTTC	ACG
rs912430	GCACAAAACCCAACTATTTTTTCC	ACT
rs1408225	CCTCAGACTGGGTGGCTTA	ACT
rs998657	CACCCACCTGAGGGAGGC	ACT
rs1324006	GATACCTTGAAGAATTTTTAAAAC	ACG
rs1924417	TTTAGGCACATTTGTACTTATAAA	ACT
rs2038728	TGGACACAAGTCCATGCAACA	ACG
rs912429	CTGTGACAGGTGCTATTATCA	CGT
rs3742269	TTTTGGACCGATTTCCGGTG	ACT
rs3742270	GCTGACGGGGATTCCCTTTA	ACT
rs3803192	GATGCACTAAAAGCAGCAATGT	ACT
rs3803191	TCCAGCCTTCATATTTTCCTC	ACG
rs754106	ATCCAGCAAGGCACTTAGAAT	ACT
rs2005053	TGTGGCCTTCAGATGCTTACAT	ACG
rs1535793	GAGGAACAGAGCCCAAAGGACA	ACT
rs1886220	CTGACCTCGTGATCCGCC	ACG
rs1886219	ACTGGATTTGCTGGAGTTAAGAA	CGT
rs1535792	TATCAGTGACTGTCCTTTTCTTTT	CGT
rs1535791	TTATCCTTACAATTGAAGAAAGGA	ACT

dbSNP rs#	Extend Primer	Term Mix
rs912428	CCATTCCAGGGAGACTCCCA	ACT
rs1886218	GAAAACAAGTCAAGACATTTATTG	ACT
rs1570622	CTGCCACACTCTTTAGATGAAGTT	ACG
rs912427	GGGAGATGACAGAACAAACT	ACT
rs912426	AGGTGCCAAGTGTTAGAAGAAAC	ACG
rs3068693	GCCTCACATTGTTTTTTTTTTTTT	ACT
rs1570621	TCGGTCATAACTTTAATGAAGG	ACG
rs1886965	TGATTTTATGACTCACATTATTTTC	ACT
rs1008849	GTGAATTGTGCAGCTATAAACATG	ACG
rs912434	AGACGTGCCCAGCTATGATA	ACT
rs3889095	TCCCCCATAACATTTTCAGCAT	ACT
rs716223	GTGGTTTGTATTTCCAGTGTCA	ACT
rs2897207	AACTATGAGAAATAAATGTGTGGG	ACT
rs1570620	TTGATATGGTTCTTGGTTGTTGG	ACG
rs1467605	GTAAGCGCTAGAAAGAAAAATAA	ACT
rs1467604	ACGGCATGTTACAGGGTGGTAAG	ACG
rs1408224	GGGCACACATTCAGAACTGCCC	ACG
rs1408223	ACAGAGGAAGACCAAATGACA	ACG

Genetic Analysis

[0262] Allelotyping results from the discovery cohort are shown for cases and controls in Table 35. The allele frequency for the A2 allele is noted in the fifth and sixth columns for osteoarthritis case pools and control pools, respectively, where “AF” is allele frequency. The allele frequency for the A1 allele can be easily calculated by subtracting the A2 allele frequency from 1 (A1 AF = 1-A2 AF). For example, the SNP rs1570976 has the following case and control allele frequencies: case A1 (C) = 0.49; case A2 (T) = 0.51; control A1 (C) = 0.53; and control A2 (T) = 0.47, where the nucleotide is provided in paranthesis. Some SNPs are labeled “untyped” because of failed assays.

TABLE 35

dbSNP rs#	Position in SEQ ID NO: 5	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1012628	243	44917643	C/T	0.70	0.70	0.768
rs1570976	10208	44927608	C/T	0.51	0.47	0.125
rs912436	15049	44932449	C/T	0.98	untyped	
rs912435	15111	44932511	A/G	0.64	0.36	~0.0001
rs912433	15272	44932672	C/T	0.22	0.23	0.581
rs912432	15287	44932687	A/G	0.46	0.44	0.282
rs912431	15326	44932726	A/G	0.46	0.46	0.969
rs912430	15327	44932727	C/T	0.20	0.19	0.584
rs1408225	17038	44934438	C/T			
rs998657	19391	44936791	A/G	0.47	0.44	0.254
rs1324006	21702	44939102	C/T	0.55	0.53	0.419
rs1924417	22431	44939831	C/G	0.53	0.49	0.108
rs2038728	22881	44940281	A/G	0.34	0.38	0.082
rs912429	27744	44945144	A/T			
rs3742269	32564	44949964	A/G	0.83	0.83	0.967
rs3742270	32698	44950098	A/C	0.53	0.50	0.170
rs3803192	33104	44950504	G/T			
rs3803191	33181	44950581	C/T			

dbSNP rs#	Position in SEQ ID NO: 5	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs754106	33256	44950656	C/T	0.40	0.41	0.714
rs2005053	33543	44950943	C/T	0.40	0.40	0.877
rs1535793	35567	44952967	C/T	0.26	0.26	0.910
rs1886220	40085	44957485	C/T			
rs1886219	40482	44957882	A/T	0.21	0.22	0.867
rs1535792	45641	44963041	A/T	0.73	0.71	0.550
rs1535791	46059	44963459	A/G	0.08	0.15	0.009
rs912428	48504	44965904	C/T			
rs1886218	48919	44966319	A/C			
rs1570622	49693	44967093	C/T	0.73	0.75	0.451
rs912427	49874	44967274	A/G	0.68	0.70	0.352
rs912426	50020	44967420	A/G	0.76	0.77	0.680
rs3068693	50616	44968016	-/TTT	0.22	0.21	0.597
rs1570621	50719	44968119	A/G	0.19	0.18	0.569
rs1886965	55511	44972911	C/T			
rs1008849	65533	44982933	A/G	0.48	0.43	0.160
rs912434	70529	44987929	A/C	0.23	0.23	0.988
rs3889095	75591	44992991	C/T	0.90	0.90	0.880
rs716223	77266	44994666	G/T	0.91	0.90	0.981
rs2897207	80368	44997768	G/T	0.46	0.46	0.921
rs1570620	82475	44999875	A/G	0.67	0.68	0.738
rs1467605	92462	45009862	G/T	0.29	0.22	0.044
rs1467604	92480	45009880	C/T	0.68	0.67	0.537
rs1408224	95819	45013219	C/T	0.66	0.65	0.683
rs1408223	96275	45013675	C/T	0.29	0.28	0.587

[0263] The *LRCH1* proximal SNPs were also allelotyped in the replication cohorts using the methods described herein and the primers provided in Tables 33 and 34. The replication allelotyping results for replication cohort #1 and replication cohort #2 are provided in Tables 36 and 37, respectively.

TABLE 36

dbSNP rs#	Position in SEQ ID NO: 5	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1012628	243	44917643	C/T	0.69	0.72	0.337
rs1570976	10208	44927608	C/T	0.48	0.46	0.490
rs912436	15049	44932449	C/T			
rs912435	15111	44932511	A/G	0.16	untyped	0.637
rs912433	15272	44932672	C/T	0.28	0.28	0.984
rs912432	15287	44932687	A/G	0.46	0.42	0.260
rs912431	15326	44932726	A/G	0.46	0.48	0.602
rs912430	15327	44932727	C/T	0.18	0.20	0.476
rs1408225	17038	44934438	C/T			
rs998657	19391	44936791	A/G	0.46	0.43	0.380
rs1324006	21702	44939102	C/T	0.54	0.53	0.811
rs1924417	22431	44939831	C/G	0.51	0.49	0.440
rs2038728	22881	44940281	A/G	0.35	0.39	0.181
rs912429	27744	44945144	A/T			
rs3742269	32564	44949964	A/G	0.84	0.85	0.911
rs3742270	32698	44950098	A/C	0.56	0.50	0.090
rs3803192	33104	44950504	G/T			
rs3803191	33181	44950581	C/T			
rs754106	33256	44950656	C/T	0.40	0.40	0.827
rs2005053	33543	44950943	C/T	0.40	0.37	0.328
rs1535793	35567	44952967	C/T	0.27	0.24	0.259
rs1886220	40085	44957485	C/T			
rs1886219	40482	44957882	A/T	0.22	0.19	0.302

dbSNP rs#	Position in SEQ ID NO: 5	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1535792	45641	44963041	A/T	0.73	0.76	0.435
rs1535791	46059	44963459	A/G	0.08	0.08	0.958
rs912428	48504	44965904	C/T	See replication genotyping results in Tables 8 & 9.		
rs1886218	48919	44966319	A/C			
rs1570622	49693	44967093	C/T	0.71	0.79	0.007
rs912427	49874	44967274	A/G	0.65	0.73	0.007
rs912426	50020	44967420	A/G	0.74	0.80	0.047
rs3068693	50616	44968016	-/TTT	0.25	0.21	0.236
rs1570621	50719	44968119	A/G	0.22	0.15	0.028
rs1886965	55511	44972911	C/T			
rs1008849	65533	44982933	A/G	0.47	untyped	NA
rs912434	70529	44987929	A/C	0.24	0.19	0.083
rs3889095	75591	44992991	C/T	0.91	0.91	0.867
rs716223	77266	44994666	G/T	0.91	0.93	0.598
rs2897207	80368	44997768	G/T	0.48	0.45	0.321
rs1570620	82475	44999875	A/G	0.66	0.72	0.034
rs1467605	92462	45009862	G/T	0.29	0.22	0.044
rs1467604	92480	45009880	C/T	0.66	0.70	0.307
rs1408224	95819	45013219	C/T	0.64	0.67	0.312
rs1408223	96275	45013675	C/T	0.31	0.23	0.028

TABLE 37

dbSNP rs#	Position in SEQ ID NO: 5	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1012628	243	44917643	C/T	0.71	0.68	0.438
rs1570976	10208	44927608	C/T	0.55	0.50	0.159
rs912436	15049	44932449	C/T			
rs912435	15111	44932511	A/G	0.66	untyped	
rs912433	15272	44932672	C/T	0.14	0.17	0.479
rs912432	15287	44932687	A/G	0.47	0.46	0.806
rs912431	15326	44932726	A/G	0.46	0.44	0.513
rs912430	15327	44932727	C/T	0.23	0.17	0.084
rs1408225	17038	44934438	C/T			
rs998657	19391	44936791	A/G	0.48	0.45	0.518
rs1324006	21702	44939102	C/T	0.55	0.52	0.324
rs1924417	22431	44939831	C/G	0.54	0.49	0.123
rs2038728	22881	44940281	A/G	0.34	0.37	0.295
rs912429	27744	44945144	A/T			
rs3742269	32564	44949964	A/G	0.82	0.82	0.861
rs3742270	32698	44950098	A/C	0.50	0.49	0.873
rs3803192	33104	44950504	G/T			
rs3803191	33181	44950581	C/T			
rs754106	33256	44950656	C/T	0.41	0.44	0.346
rs2005053	33543	44950943	C/T	0.40	0.44	0.302
rs1535793	35567	44952967	C/T	0.25	0.31	0.096
rs1886220	40085	44957485	C/T			
rs1886219	40482	44957882	A/T	0.20	0.27	0.053
rs1535792	45641	44963041	A/T	0.73	0.63	0.007
rs1535791	46059	44963459	A/G	NA	0.27	NA
rs912428	48504	44965904	C/T	See replication genotyping results in Tables 8 & 9.		
rs1886218	48919	44966319	A/C			
rs1570622	49693	44967093	C/T	0.75	0.67	0.040
rs912427	49874	44967274	A/G	0.71	0.64	0.059
rs912426	50020	44967420	A/G	0.78	0.72	0.065
rs3068693	50616	44968016	-/TTT	0.19	0.21	0.520
rs1570621	50719	44968119	A/G	0.15	0.21	0.077
rs1886965	55511	44972911	C/T			
rs1008849	65533	44982933	A/G	0.49	0.43	0.138

dbSNP rs#	Position in SEQ ID NO: 5	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs912434	70529	44987929	A/C	0.21	0.28	0.027
rs3889095	75591	44992991	C/T	0.89	0.88	0.583
rs716223	77266	44994666	G/T	0.90	0.87	0.368
rs2897207	80368	44997768	G/T	0.44	0.48	0.276
rs1570620	82475	44999875	A/G	0.70	0.62	0.026
rs1467605	92462	45009862	G/T			
rs1467604	92480	45009880	C/T	0.71	0.62	0.018
rs1408224	95819	45013219	C/T	0.68	0.61	0.060
rs1408223	96275	45013675	C/T	0.27	0.34	0.023

[0264] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 1E for the discovery cohort. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 1E can be determined by consulting Table 35. For example, the left-most X on the left graph is at position 44917643. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0265] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The generally bottom-most curve is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0266] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is placed at the 3' end of each gene to show the direction of transcription.

Example 9

SNW1 Region Proximal SNPs

[0267] SNP rs1477261 is associated with osteoarthritis and is described in Table A. It lies within an intron of the SKI-interacting protein gene (*SNW1*). This gene, a member of the SNW gene family,

encodes a coactivator that enhances transcription from some Pol II promoters. This coactivator can bind to the ligand-binding domain of the vitamin D receptor and to retinoid receptors to enhance vitamin D-, retinoic acid-, estrogen-, and glucocorticoid-mediated gene expression. It also can interact with poly(A)-binding protein 2 to directly control the expression of muscle-specific genes at the transcriptional level. One hundred sixty-three additional allelic variants proximal to rs1477261 were identified and subsequently allelotyped in osteoarthritis case and control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 38. The chromosome position provided in column four of Table 38 is based on Genome "Build 34" of NCBI's GenBank.

TABLE 38

dbSNP rs#	Chromosome	Position in SEQ ID NO: 6	Chromosome Position	Allele Variants
rs7143926	14	218	76161268	a/t
rs1549071	14	1440	76162490	c/t
rs8012858	14	1442	76162492	c/t
rs7155611	14	2611	76163661	c/t
rs176941	14	4317	76165367	a/c
rs176942	14	4724	76165774	a/g
rs176943	14	4788	76165838	g/t
rs176944	14	5202	76166252	g/t
rs4365221	14	5780	76166830	c/t
rs3168952	14	5974	76167024	c/t
rs176945	14	6644	76167694	c/g
rs176946	14	7430	76168480	a/g
rs176947	14	7938	76168988	c/t
rs176948	14	8095	76169145	c/t
rs176949	14	8183	76169233	a/c
rs176950	14	8312	76169362	c/t
rs176951	14	8352	76169402	a/c
rs7156905	14	9348	76170398	c/t
rs3217197	14	9378	76170428	-/tctc
rs2270443	14	9617	76170667	a/g
rs176952	14	9727	76170777	c/t
rs176953	14	9834	76170884	c/t
rs176954	14	9899	76170949	g/t
rs176955	14	10211	76171261	c/t
rs3214416	14	10377	76171427	-/t
rs176956	14	10695	76171745	c/t
rs2544566	14	10729	76171779	c/g
rs2544567	14	10730	76171780	c/t
rs176957	14	11433	76172483	a/g
rs176958	14	11951	76173001	c/g
rs176959	14	12697	76173747	c/t
rs1802227	14	12982	76174032	a/c
rs176961	14	14419	76175469	c/t
rs176962	14	14501	76175551	c/t
rs7401285	14	14983	76176033	a/c
rs176963	14	15280	76176330	c/t
rs176964	14	15475	76176525	a/g
rs4903631	14	15888	76176938	a/g

dbSNP rs#	Chromosome	Position in SEQ ID NO: 6	Chromosome Position	Allele Variants
rs4903632	14	15976	76177026	a/t
rs176965	14	16307	76177357	a/c
rs4903633	14	16442	76177492	a/c
rs176966	14	17255	76178305	c/t
rs176968	14	18948	76179998	g/t
rs176969	14	19435	76180485	a/t
rs176970	14	19753	76180803	c/t
rs7149198	14	20021	76181071	c/t
rs7147918	14	20022	76181072	a/c
rs7148685	14	20503	76181553	a/g
rs1184232	14	20590	76181640	g/t
rs1184233	14	21804	76182854	g/t
rs1184234	14	21919	76182969	c/t
rs7401998	14	21990	76183040	a/t
rs176974	14	22412	76183462	a/g
rs6574390	14	22536	76183586	c/t
rs176975	14	23432	76184482	a/g
rs176976	14	23468	76184518	g/t
rs176977	14	23772	76184822	c/t
rs8013727	14	24325	76185375	c/t
rs176978	14	24773	76185823	c/t
rs2111829	14	26274	76187324	c/t
rs176980	14	27440	76188490	c/g
rs5809848	14	28561	76189611	-/acag
rs5809849	14	30071	76191121	-/a
rs4383070	14	31764	76192814	a/t
rs7493652	14	33008	76194058	c/t
rs2112133	14	35310	76196360	a/t
rs1963833	14	35460	76196510	a/c
rs6574391	14	37112	76198162	a/g
rs7155062	14	37285	76198335	a/g
rs4899674	14	37747	76198797	c/t
rs8022516	14	38057	76199107	c/t
rs7140838	14	38859	76199909	a/c
rs7141127	14	38860	76199910	a/g
rs6574392	14	39525	76200575	a/g
rs8003691	14	40216	76201266	a/g
rs8003979	14	40281	76201331	c/t
rs8010541	14	41453	76202503	c/g
rs8016416	14	42091	76203141	a/t
rs8016175	14	42513	76203563	a/g
rs7154571	14	42935	76203985	c/t
rs7158826	14	42985	76204035	a/g
rs7159310	14	43003	76204053	a/g
rs7401900	14	43281	76204331	a/g
rs7160355	14	43716	76204766	c/t
rs2032781	14	43866	76204916	a/g
rs6574394	14	44234	76205284	g/t
rs8007598	14	44596	76205646	a/g
rs2267767	14	44871	76205921	c/t
rs6574395	14	45005	76206055	a/g
rs7150066	14	45282	76206332	a/c

dbSNP rs#	Chromosome	Position in SEQ ID NO: 6	Chromosome Position	Allele Variants
rs7492334	14	47178	76208228	a/c
rs4359361	14	47816	76208866	g/t
rs4605089	14	47887	76208937	a/g
rs7146446	14	48134	76209184	c/t
rs4346144	14	48135	76209185	a/g
rs7148078	14	48276	76209326	g/t
rs7148286	14	48400	76209450	c/t
rs3783980	14	48798	76209848	a/g
rs1549119	14	48803	76209853	a/t
rs1984925	14	49146	76210196	c/t
rs1477261	14	49969	76211019	a/t
rs8016447	14	51059	76212109	a/g
rs7494044	14	51064	76212114	c/t
rs2023288	14	53285	76214335	a/t
rs7151685	14	54560	76215610	c/t
rs2112135	14	54748	76215798	a/g
rs2161088	14	54785	76215835	c/g
rs4903638	14	55102	76216152	c/g
rs1477262	14	55644	76216694	a/g
rs1477263	14	55705	76216755	g/t
rs1477264	14	55841	76216891	a/g
rs2277917	14	56623	76217673	c/g
rs2277918	14	56825	76217875	a/c
rs2277919	14	56827	76217877	a/g
rs1978416	14	56892	76217942	c/t
rs3759728	14	59150	76220200	a/t
rs6574399	14	59958	76221008	a/t
rs7155336	14	60231	76221281	c/t
rs7156186	14	60524	76221574	a/g
rs7142390	14	61871	76222921	c/t
rs7145875	14	62226	76223276	c/t
rs8014635	14	63230	76224280	g/t
rs8015938	14	63468	76224518	g/t
rs8015313	14	63787	76224837	c/t
rs8006315	14	65732	76226782	a/c
rs6574400	14	65989	76227039	a/g
rs7140816	14	68832	76229882	g/t
rs4566078	14	69904	76230954	c/t
rs7141050	14	70365	76231415	a/g
rs3049356	14	70886	76231936	-/tattc
rs4903639	14	73088	76234138	a/t
rs4903641	14	73103	76234153	c/t
rs2364838	14	75934	76236984	c/t
rs2364839	14	75966	76237016	c/t
rs4632066	14	76273	76237323	c/t
rs2112136	14	77943	76238993	c/t
rs4641655	14	78466	76239516	c/t
rs4635269	14	78861	76239911	c/t
rs4570764	14	78872	76239922	a/g
rs759808	14	79836	76240886	g/t
rs7150531	14	80908	76241958	c/t
rs7154968	14	81509	76242559	c/g

dbSNP rs#	Chromosome	Position in SEQ ID NO: 6	Chromosome Position	Allele Variants
rs7146657	14	83576	76244626	c/t
rs7145859	14	83662	76244712	c/g
rs4903643	14	83782	76244832	c/t
rs717682	14	84282	76245332	g/t
rs717683	14	84444	76245494	a/g
rs1477259	14	85129	76246179	c/g
rs8019064	14	85151	76246201	a/g
rs8018971	14	85296	76246346	a/c
rs1477260	14	85809	76246859	c/g
rs5809851	14	86387	76247437	-/t
rs1985149	14	86494	76247544	a/g
rs1008988	14	89786	76250836	a/g
rs1008989	14	89894	76250944	a/t
rs8018222	14	90122	76251172	g/t
rs1006040	14	92067	76253117	a/g
rs1006039	14	92187	76253237	c/t
rs1006038	14	92312	76253362	a/g
rs8009784	14	92824	76253874	g/t
rs4903644	14	93733	76254783	c/t
rs7149496	14	96553	76257603	c/g
rs6574402	14	96941	76257991	a/c

Assay for Verifying and Allelotyping SNPs

[0268] The methods used to verify and allelotype the 101 proximal SNPs of Table 38 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 39 and Table 40, respectively.

TABLE 39

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs7143926	ACGTTGGATGGAGTCACCCAAAATTAAGGC	ACGTTGGATGGAAAGCCAAAATTAGCCTGC
rs1549071	ACGTTGGATGGTGAGACGCTGTCTCAGTAA	ACGTTGGATGCTCCACACTTGGAGAAGTTG
rs8012858	ACGTTGGATGGTGAGACGCTGTCTCAGTAA	ACGTTGGATGCTCCACACTTGGAGAAGTTG
rs7155611	ACGTTGGATGATGGAATACAGGCACCGTTC	ACGTTGGATGCCCTTCTTAATCTCCATGG
rs176941	ACGTTGGATGTTAGTATGGGAAAAGGGCTC	ACGTTGGATGCAACAATCCTATGAGTTGGG
rs176942	ACGTTGGATGAGTGGCTCAGATGTGAGTAG	ACGTTGGATGTGGTCTTCACCAACCACATG
rs176943	ACGTTGGATGACCAAGCCCAGTAAAGTCTC	ACGTTGGATGGCATCCGCAAGATGCTAATG
rs176944	ACGTTGGATGGGCCTCAATATTGGCTAAATG	ACGTTGGATGCTTAACCATTAGAGCCCTTC
rs4365221	ACGTTGGATGAAATAAGGCAGGAAGGGTAG	ACGTTGGATGTCCCAACTTACTGGTCTTTC
rs3168952	ACGTTGGATGATGTACCAGACTTGGTGGTG	ACGTTGGATGTTTGCTGAGGATGGAGACTG
rs176945	ACGTTGGATGCCTACTATACACTCACAAA	ACGTTGGATGTTTTTTAAACACTTTAAGC
rs176946	ACGTTGGATGGCTTTATCATAGGTATTTGTG	ACGTTGGATGGAGAGATGTGTTGTTTTTGAG
rs176947	ACGTTGGATGTGAGTAGCTGGGACTACAGG	ACGTTGGATGGGCCAACATAGCGAAACTCC
rs176948	ACGTTGGATGCAGAGCCAAAGGTCAACAAG	ACGTTGGATGTACAGGTGTGAGCCTTCATG
rs176949	ACGTTGGATGTAGGAACTCCCTGCAGTTCC	ACGTTGGATGCCTTGCTGGCTTTAAAGAAG
rs176950	ACGTTGGATGAATCACAGGAGTGACATCCC	ACGTTGGATGTGGAGGAGAAACCTGACTTG
rs176951	ACGTTGGATGCCCTATATAATCTCCTCCCC	ACGTTGGATGCAGGAGTGACATCCCATTAC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs7156905	ACGTTGGATGTGAGAGAGAGAACCTGTCTC	ACGTTGGATGAAAGGCGGCTTTGATGTTGG
rs3217197	ACGTTGGATGTTGATTGTGCCACTGCACTC	ACGTTGGATGACTCTAGTTGGAAATCCTGG
rs2270443	ACGTTGGATGATAACTCAGTCCAGGTGTGG	ACGTTGGATGCACTCAAGCAGTCTACTCAC
rs176952	ACGTTGGATGGATCTCAGCTCACTGCAATC	ACGTTGGATGTATCTGGGTGACTGAGGAAG
rs176953	ACGTTGGATGTTGAGGTCAGGAGTTTGGGA	ACGTTGGATGGCCACCACACCCAGCTAATT
rs176954	ACGTTGGATGAAAACATAGGCCAGGTGCAG	ACGTTGGATGAAACTCCTGACCTCAAGCCA
rs176955	ACGTTGGATGCTAGAGTGCTTGGATGTACC	ACGTTGGATGGTCATCTACAGGGACTAGAC
rs3214416	ACGTTGGATGACGACTATCATCACGTGTTT	ACGTTGGATGACCAGAAGTCTGTAAGTAGG
rs176956	ACGTTGGATGTACAGGCATAAGCCACCATG	ACGTTGGATGAGGAAGGGTGTAAAGCAAGG
rs2544566	ACGTTGGATGCAAGCAATCTTCCCATCTGG	ACGTTGGATGTGATCCGATTTTTTGGCTGGG
rs2544567	ACGTTGGATGCAAGCAATCTTCCCATCTGG	ACGTTGGATGTGATCCGATTTTTTGGCTGGG
rs176957	ACGTTGGATGTTTCACCGTGTTAGCCAGGA	ACGTTGGATGTAATCCCAGCACTTTGGGAG
rs176958	ACGTTGGATGAAAACCTGGGCACTCTACCAC	ACGTTGGATGAAAATCGCGCCATTGCACTC
rs176959	ACGTTGGATGCAGGCAGTTTTTATTTGTCCC	ACGTTGGATGGGTTAGGGAGTCATAATACC
rs1802227	ACGTTGGATGAACAAATAGTTGCACCAAG	ACGTTGGATGTTTTAATTTGGAGTGGGCA
rs176961	ACGTTGGATGAACCCAGTTTAAGACCGGCC	ACGTTGGATGTACAGGTGTGTGCCACCATG
rs176962	ACGTTGGATGATATTTCTGGCTGGGCACTG	ACGTTGGATGACTGGGTTCAAGCAATCTGC
rs7401285	ACGTTGGATGACAGAGTGGGACTCCATATC	ACGTTGGATGGATTCAAACCTGGGTGTCTTG
rs176963	ACGTTGGATGTAAGCCTGGGAAAACACACG	ACGTTGGATGCCCACTCTACTTTCCAGTAG
rs176964	ACGTTGGATGAGAGTCAGTGTCCTACAAAA	ACGTTGGATGTAATCCCGTTTTACAGCTTC
rs4903631	ACGTTGGATGGTAAATGCCAGCATGATGAC	ACGTTGGATGTCTCAGCCCACTATAAGAAG
rs4903632	ACGTTGGATGTGTGAATACCTATCCTCAGG	ACGTTGGATGGTCATCATGCTGGCATTAC
rs176965	ACGTTGGATGAATGCTTTATAAGGGCTGCC	ACGTTGGATGTCTCAGAAACAAAGGATGTG
rs4903633	ACGTTGGATGCAACCCCCAAACCATCATAT	ACGTTGGATGCTAACAGATTCTGTTGACATGG
rs176966	ACGTTGGATGCTCTCGAGTAGCTGGGACTA	ACGTTGGATGTGGCCAACATGGTGAAACCC
rs176968	ACGTTGGATGGCGAAACTCCGTCTCAAAC	ACGTTGGATGTAGTGATCTTCCCACCTAGG
rs176969	ACGTTGGATGCTGTCTGTCCGATTTACTGC	ACGTTGGATGTCTAGAATCAAGCATGCGGC
rs176970	ACGTTGGATGCTAATGTTTCTAGTACAGTGG	ACGTTGGATGCTTCTCTTCTAGCTATTTTGC
rs7149198	ACGTTGGATGCAATGGGATATTACTCAGCC	ACGTTGGATGTTTCTGTGCCGGGCTTATTC
rs7147918	ACGTTGGATGCAATGGGATATTACTCAGCC	ACGTTGGATGTTTCTGTGCCGGGCTTATTC
rs7148685	ACGTTGGATGTGTCTTCTTTTGAGACCGTC	ACGTTGGATGCTCAATCGCAAAGAAACGAG
rs1184232	ACGTTGGATGAAGAGGCCACCTACAGAATG	ACGTTGGATGCTCGTTTCTTTGCGATTGAG
rs1184233	ACGTTGGATGAAGTGTTGGGATTACAGGTG	ACGTTGGATGAGTGAAAGATCGCCACAAAG
rs1184234	ACGTTGGATGGCTATGTGCAGTGAATCATG	ACGTTGGATGTCTCAGACCTCAGGTGATCT
rs7401998	ACGTTGGATGTGAGTAGCTAGGACAACAGG	ACGTTGGATGAACGTGGTGAAACCCCATCT
rs176974	ACGTTGGATGTTACAGCGAGCTGAGATCAT	ACGTTGGATGAGGATCATACTGTCTCTGAC
rs6574390	ACGTTGGATGTGATGAAACCCCGTCTGTAC	ACGTTGGATGTCCTGAGTAGCTGGGATTAC
rs176975	ACGTTGGATGTGTAGAATCTAGGTGGTAGG	ACGTTGGATGCCAGCCTTTCCTGACATTTT
rs176976	ACGTTGGATGGGTAGGAGATACAGGTGTTT	ACGTTGGATGCCAGCCTTTCCTGACATTTT
rs176977	ACGTTGGATGTTGCATCATTACACTTCAGC	ACGTTGGATGGGGAAACATTATGCATAATTCC
rs8013727	ACGTTGGATGTGCCTGGTTGTATACCTAAC	ACGTTGGATGCTTGAGAACGATTCTGTTGTC
rs176978	ACGTTGGATGGGGACCATGTTTTTGTACC	ACGTTGGATGAATACTGTGGAATGGGCATG
rs2111829	ACGTTGGATGCATGTGAAAAAGGTATGAC	ACGTTGGATGCCTACTTTATATGCAGTAGG
rs176980	ACGTTGGATGATGGCCAATGCTATGAACGC	ACGTTGGATGAAGGGCAGTTGCAGGAAAAG
rs5809848	ACGTTGGATGTCTATTTTTCCAGAGCTTGGG	ACGTTGGATGCCATTTCACTGATGCTTTGG
rs5809849	ACGTTGGATGGTGAATACCGTGTCAAGTCC	ACGTTGGATGTGCAGTGAGCTGAGATCATG
rs4383070	ACGTTGGATGAGCGATTCTCTTGTCTCAGC	ACGTTGGATGAACTTAGCTGGGCATTGTGG
rs7493652	ACGTTGGATGGGTCAATATACCACAAGTAAC	ACGTTGGATGCTGGCCCTATGCTATTTTCA
rs2112133	ACGTTGGATGGCCACCACAACCTGGCTAATT	ACGTTGGATGTGTGGTCAAGAGATCGAAAC
rs1963833	ACGTTGGATGTAAGCCAAGATTGCGTCACT	ACGTTGGATGAGCATTAAAGGTAGAATGCC
rs6574391	ACGTTGGATGTAACCGTTGCTATGGAGAAG	ACGTTGGATGACCTATACAACCCTAAGCTG
rs7155062	ACGTTGGATGGCTCCTTATTTGGGCATTCC	ACGTTGGATGCACTCAGCCTTGTGAGATAC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs4899674	ACGTTGGATGAATGTGCTGAGGAACTGAG	ACGTTGGATGGCTTCTGATACTTTCAAGAG
rs8022516	ACGTTGGATGGTTGAAGGCATTCTTTTGGG	ACGTTGGATGCTAGCCTGGGCAATATAATG
rs7140838	ACGTTGGATGCCTCGTTTCTGAAGAATAACC	ACGTTGGATGGAGACTGAACAGGTTATTGG
rs7141127	ACGTTGGATGCCTCGTTTCTGAAGAATAACC	ACGTTGGATGGAGACTGAACAGGTTATTGG
rs6574392	ACGTTGGATGAGAAAATAGCATAGGCTGGG	ACGTTGGATGAAATGATCCATCCTCCTCAG
rs8003691	ACGTTGGATGACTGAAGTCAAGTGAAGGCC	ACGTTGGATGTTAGGCCCTATACATGGAG
rs8003979	ACGTTGGATGCACAAAACCACTTCTGAAGC	ACGTTGGATGGGGCCTAATTTTCCTTTTGC
rs8010541	ACGTTGGATGCACTTTTCTTGGCTAGCTTC	ACGTTGGATGCAGAATGGCTAAACTGAAC
rs8016416	ACGTTGGATGTGCCATAACTTCCTTTGAC	ACGTTGGATGGCCACGGAATCCTATATAGA
rs8016175	ACGTTGGATGTTGAGCACTGAGTGAGTGAG	ACGTTGGATGTCCTAACCGTGAGTGATCTG
rs7154571	ACGTTGGATGATGTGAGGAGCACCTCTGCC	ACGTTGGATGCTCTTCCCTTCTCAGACGG
rs7158826	ACGTTGGATGCACCTCCCTCCTGGACGGG	ACGTTGGATGGCCACCCCGTCTGAGAAGG
rs7159310	ACGTTGGATGACCCCGTCTGAGAAGGGAAG	ACGTTGGATGCACCTCCCTCCTGGACGGG
rs7401900	ACGTTGGATGCCCAACAGCTCATTGAGAAC	ACGTTGGATGTCTTTTCCCCACATTTCCCC
rs7160355	ACGTTGGATGTCACCTTGTATCTGCTGAC	ACGTTGGATGTTATTGATCATTCTTGGGTG
rs2032781	ACGTTGGATGTATATCACTGTAGTAACAGC	ACGTTGGATGACCATAAGTATATATCACAAAG
rs6574394	ACGTTGGATGACCACACCCAGCCTATTTGT	ACGTTGGATGTTATGCTGAAAGCCTGGGAG
rs8007598	ACGTTGGATGCTGGCAAAAGTCTCTTAACAC	ACGTTGGATGTTGGTTAAAGTCACAGAATG
rs2267767	ACGTTGGATGGTTTCACCATGTTAGCCAGG	ACGTTGGATGTAATCCCAGCACTTTGGGAG
rs6574395	ACGTTGGATGAACCTTGAACCTTTGGGCTC	ACGTTGGATGAAAAAATTACCGGGCATGG
rs7150066	ACGTTGGATGAAGCAATCCTCCTGCTTCTG	ACGTTGGATGAGATCAGGTGTAGATCCAGG
rs7492334	ACGTTGGATGGCCTTTGCATTGGCTATTTG	ACGTTGGATGTAGAAAGCAGTCATGGGAAG
rs4359361	ACGTTGGATGGTAGTATTTGCTTAGTACAC	ACGTTGGATGTTCTAAGCCTGAATGTTTCC
rs4605089	ACGTTGGATGAATACCTATGAGATCTCAGG	ACGTTGGATGCCTTGTAACCTTTAACATC
rs7146446	ACGTTGGATGATTCACTTTTACAAGACCTC	ACGTTGGATGGCATATTGTACTTAGGAACTC
rs4346144	ACGTTGGATGATTCACTTTTACAAGACCTC	ACGTTGGATGGCATATTGTACTTAGGAACTC
rs7148078	ACGTTGGATGTGTGTCAGATTGATGGCTTG	ACGTTGGATGCCAAGAGAATAAAGCTGAGAG
rs7148286	ACGTTGGATGGTGGTCATTAAGCTTGCCAG	ACGTTGGATGTGCTATGGATGCTGCTTGAG
rs3783980	ACGTTGGATGTTTTTTGCCCCAGGTAAGAC	ACGTTGGATGTGGTGCTTTTGTCTCTCTG
rs1549119	ACGTTGGATGTTTCATCTTCCTCTGCCTCC	ACGTTGGATGGTGAAGGCCAGTCATATTGC
rs1984925	ACGTTGGATGAAGTAGCCAGGATTACAGGC	ACGTTGGATGCCAGCCTAGCAAACATGGTG
rs1477261	ACGTTGGATGCAGGGTTATGTGGTATTATC	ACGTTGGATGGGGAAAGTAAAAGATAAGAG
rs8016447	ACGTTGGATGAATTACAGACGTGTGCCACC	ACGTTGGATGTGACACAGAGAGACTCTGTC
rs7494044	ACGTTGGATGAATTACAGACGTGTGCCACC	ACGTTGGATGTGACACAGAGAGACTCTGTC
rs2023288	ACGTTGGATGGAGAAAAATTGTGATTGATTG	ACGTTGGATGGCCATCAAATCAATCTAATC
rs7151685	ACGTTGGATGACAGTGCTGGCATTACTGGC	ACGTTGGATGTAAAGATCGTCTGCCACTGC
rs2112135	ACGTTGGATGAGTGCAGTGGCCCAATCACA	ACGTTGGATGGTCTAGAGTCCCAGCTACTC
rs2161088	ACGTTGGATGTATAGGGTCTCACTCTTGCC	ACGTTGGATGAGGAGGATCACCTGAGCCTT
rs4903638	ACGTTGGATGATAGGGTGTACTGCGTTGG	ACGTTGGATGAGGCCTAGGTGAGAAGATTG
rs1477262	ACGTTGGATGATGCGTGAGGAGAATGAAGG	ACGTTGGATGAAGGCTAGTGTTTCAAGGAGG
rs1477263	ACGTTGGATGAACCTTCCTGAACACTAGCC	ACGTTGGATGCCTTGCTGCCCCATTTTAAG
rs1477264	ACGTTGGATGCGTAGATAGAACCACCTCAG	ACGTTGGATGAAAGGCGGAGAGCACTTTAC
rs2277917	ACGTTGGATGGCATTGTTGCTAGCTGAAG	ACGTTGGATGTTGAACAGGAGTACCGTTTG
rs2277918	ACGTTGGATGTTACGTTCTTACTCAGTCC	ACGTTGGATGACCTGTCGTTTTAAACGCCC
rs2277919	ACGTTGGATGTTACGTTCTTACTCAGTCC	ACGTTGGATGACCTGTCGTTTTAAACGCCC
rs1978416	ACGTTGGATGAGGGCGTTTAAACGACAGG	ACGTTGGATGCGGGTGAGAGGATATGGTTT
rs3759728	ACGTTGGATGATAGTCCCTCGCTGTTTTGG	ACGTTGGATGAGAAAGCACTAGGCCTTTGG
rs6574399	ACGTTGGATGATGCTCTGATGCCATTATGC	ACGTTGGATGAGGGCACGTAAACACATCC
rs7155336	ACGTTGGATGGAGGAAGACTCGGTCTAAAA	ACGTTGGATGAACAATCTGACACTAGGTGC
rs7156186	ACGTTGGATGATTACGGGTATGAGCCACTG	ACGTTGGATGGAACCTGGACATTAGGTCTGG
rs7142390	ACGTTGGATGTAATCAAGACAGTGTGGTAC	ACGTTGGATGGGGTTTATTTCAAGGACTCTC
rs7145875	ACGTTGGATGGTCCTTTGAAGCACAAAACC	ACGTTGGATGCTTCATGATCTTGGATTGGC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs8014635	ACGTTGGATGGTCTTCTCACTCAAGAACAC	ACGTTGGATGCAACAGAGCAAGACTCCAAC
rs8015938	ACGTTGGATGCCCTGAACTCAAGTGATCTG	ACGTTGGATGATCTAAACAGTGTTCTGCGC
rs8015313	ACGTTGGATGAAAACTGATTCTGTACCTGG	ACGTTGGATGGTCAGTCATTTTATAGGCAG
rs8006315	ACGTTGGATGTCACCTTGAGGTCAGGAGTTC	ACGTTGGATGCCATGCCTGGCTAAGTTTTG
rs6574400	ACGTTGGATGTTATCCTTCCTCTGCCAGTG	ACGTTGGATGCCTTTGAACTTCCTACCCAG
rs7140816	ACGTTGGATGCAATAGAGTGAGACTCTGTC	ACGTTGGATGATTTCATGAGCCTCTCTTTAC
rs4566078	ACGTTGGATGTAGAGTCTTGTTCTGTACC	ACGTTGGATGAGGAGAATCGCTTGAACCCA
rs7141050	ACGTTGGATGATATGTTATACATATTAGTC	ACGTTGGATGCAAGTTAACCATTATCAACTC
rs3049356	ACGTTGGATGTACCACTGGCAGAGTAGAAG	ACGTTGGATGCACATGGTTTGGGTACTGAG
rs4903639	ACGTTGGATGAGCGAGACTCCGTCTCAAAA	ACGTTGGATGTCAAAGGTAGCCTTGACTGG
rs4903641	ACGTTGGATGACTCCAACCTGGGCAACAGA	ACGTTGGATGCTGGCTCCAGCACACTTATC
rs2364838	ACGTTGGATGTGTAGTCCCAGCTACTTGTG	ACGTTGGATGTGATCATAGCTCACTGCAGC
rs2364839	ACGTTGGATGTGGGCAACATAGCAAGATCC	ACGTTGGATGCTCACAAGTAGCTGGGACTA
rs4632066	ACGTTGGATGGAGAAAAAAGAGATGGAGGG	ACGTTGGATGGCCCTGACTGTGTTTTTATG
rs2112136	ACGTTGGATGTTTCTTGGGGACTAAGGCTC	ACGTTGGATGTAACAGGCCCTGAAGGAATG
rs4641655	ACGTTGGATGCGATAGAGCAACCCTGTCTC	ACGTTGGATGGCCCTACACCCAGATTCAAG
rs4635269	ACGTTGGATGAAAGTGCTGGGATTACAGGC	ACGTTGGATGCTTGCAGCATATTTCTGAGG
rs4570764	ACGTTGGATGCTTGCAGCATATTTCTGAGG	ACGTTGGATGAAAGTGCTGGGATTACAGGC
rs759808	ACGTTGGATGATGAGCTGTGATCATGCCAC	ACGTTGGATGCCTGAACTTCATTGTGCTCC
rs7150531	ACGTTGGATGATGTGCGGTGTGAAGCAAAG	ACGTTGGATGTTGTTTGGCCTGGTCTGATG
rs7154968	ACGTTGGATGTACCCAGGTAACAAACCTGC	ACGTTGGATGTCCCCTATAAGGCTTTTACAGG
rs7146657	ACGTTGGATGTGAGTAGCTGGGACTACAGG	ACGTTGGATGTAACACGGTGAAACCCCGTC
rs7145859	ACGTTGGATGAGGCAGGAGAATGGCGTGAA	ACGTTGGATGTTTTTGAGACGGAGTCTTGC
rs4903643	ACGTTGGATGTATTCCATGCTGTCTGCCTC	ACGTTGGATGAGTTGACCTTAAAGGCTGGG
rs717682	ACGTTGGATGTTTAGGGACAGAGGCTGAGG	ACGTTGGATGAAGTGCAGTGGCCTGATCTC
rs717683	ACGTTGGATGTTGGCAAAAAAGGTGGAGGC	ACGTTGGATGTGATGATGGCACAGGGAATG
rs1477259	ACGTTGGATGTGACTGAGACTACCTTCACC	ACGTTGGATGAAGTGCTCACGTAGGTTGTC
rs8019064	ACGTTGGATGCCTTGCAGCAAACCTTCAGAG	ACGTTGGATGTGACTGAGACTACCTTCACC
rs8018971	ACGTTGGATGATGGTCTCACTCTGTCACTC	ACGTTGGATGAATTGTTTGAGCCCAGGAGG
rs1477260	ACGTTGGATGAGTGTCATGGTAGCAAGGAC	ACGTTGGATGTGCCATCTGTTTCCCATAGG
rs5809851	ACGTTGGATGACAGAGAGTGTTTCAGCACAG	ACGTTGGATGTTGGGCAACAGAGAGAGACT
rs1985149	ACGTTGGATGACTGAAATCTTTGCCTCCCG	ACGTTGGATGGTGGTGCACTTATGTAGTCC
rs1008988	ACGTTGGATGAGTGTGTCTCAGGGAATGTG	ACGTTGGATGCCTGGCAATTTGTTCTCTGC
rs1008989	ACGTTGGATGGGAATAGCAAGTGTAACGGC	ACGTTGGATGACTCCAACCGCATCAGCTTC
rs8018222	ACGTTGGATGATCCTCCATATGCTGAACGC	ACGTTGGATGAAGGTGGAACGAGAGACTTG
rs1006040	ACGTTGGATGTTTAGCTCTCTCTCTGTTGC	ACGTTGGATGTCTTGAGCCCAGGAGTTCAA
rs1006039	ACGTTGGATGTGAAGCTGGGAGTTAGAGAC	ACGTTGGATGCCACCATGCCAGCTAATTT
rs1006038	ACGTTGGATGATAAGCCACTGTGCTCAGTC	ACGTTGGATGGGTAGGGTTTATTAAGTGCC
rs8009784	ACGTTGGATGTGTTTTGGCTATGCTTTGCC	ACGTTGGATGTGACAGAGCGAGACTTTGTC
rs4903644	ACGTTGGATGTTGCAGTGAGCTGAGATTGG	ACGTTGGATGGTGAATGAATGAATAAGGGCC
rs7149496	ACGTTGGATGACAACACACAGTACTGGACC	ACGTTGGATGTGGGTGCATGTTAGAAACGC
rs6574402	ACGTTGGATGCAGGTCCTTTGTCTGACAAG	ACGTTGGATGGGGATGTGCGATTTGATCTG

TABLE 40

dbSNP rs#	Extend Primer	Term Mix
rs7143926	ACCCAAAATTAAGGCAAAATGG	CGT
rs1549071	CACACACATATATACACACACA	ACG
rs8012858	CACACATATATACACACACACA	ACG

dbSNP rs#	Extend Primer	Term Mix
rs7155611	GGCACCGTTCTCTCTCTCA	ACT
rs176941	CTGGGCCTCAGTTTACTCAT	CGT
rs176942	AATAGGTTGGTTTGTGCCCC	ACT
rs176943	CCCGTAGTCCCTGTGAAAC	ACT
rs176944	AAAAGTCCACTAATCCTTCCAA	CGT
rs4365221	GAGGGCAACTCAACACATTTTA	ACG
rs3168952	TTGGTGGTGAGATGGACAGA	ACT
rs176945	TACTATACACTCACAAAAATTGTT	ACT
rs176946	TTGTATAACAAAATACCACAAGC	ACT
rs176947	GGCGCCCGCCACTACGC	ACG
rs176948	AAAACAGACCTCAGTCCTACA	ACT
rs176949	CTCCCTGCAGTTCCTTGTTA	CGT
rs176950	GGAGTGACATCCCATTACTTT	ACG
rs176951	TCCTCCCCTCCTTGGGTG	ACT
rs7156905	CTGTCTCAAAAAAGGAACCAG	ACT
rs3217197	CTCCAGCCTGAGTGAGAGA	ACT
rs2270443	CAGGTGTGGTGGCTCATGC	ACG
rs176952	CACTGCAATCGCTGCCTCC	ACG
rs176953	GGACCAGCCTGGCCAACAT	ACT
rs176954	GCAGTGGCTCAATCCCAGC	CGT
rs176955	CTGCCCTCCAGCCCTTC	ACT
rs3214416	CATCACGTGTTCTAATGAAAA	CGT
rs176956	AAGCCACCATGCCCAGCC	ACT
rs2544566	CATCTGGGCCTCCCAAAGTA	ACT
rs2544567	CATCTGGGCCTCCCAAAGT	ACT
rs176957	GGTCTCGATCTCCTGACCT	ACG
rs176958	GGAGTTTTGCTCTTGTTGCC	ACT
rs176959	TTTTATTTGTCCCTTGTTCTTTC	ACT
rs1802227	AATAGTTGCACCAAGCAAGAG	ACT
rs176961	TATGGCAAACCCCTGTCTACA	ACT
rs176962	GGCTCACGCCTGTAATCCTA	ACT
rs7401285	GGGACTCCATATCAGAAAACA	CGT
rs176963	GAAAACACACGCGGGCGC	ACT
rs176964	CAGTGTCTACAAAAGTGCCT	ACG
rs4903631	CTTGAGACAAGATGAAACAGTT	ACG
rs4903632	ATCCTCAGGGAAACGAAAATTA	CGT
rs176965	ATAAGGGCTGCCAGCTTGAT	ACT
rs4903633	TAGCAATTTTATATCTCAGCATG	ACT
rs176966	ACCACACCCAGCTAATTTTTG	ACG
rs176968	TCACACCTGTGACTCCAGC	CGT
rs176969	CCGATTTACTGCATTGCATTC	CGT
rs176970	GTACAGTGGGGTGAATAGTTA	ACT
rs7149198	GATATTACTCAGCCATAAAAAAG	ACT
rs7147918	GGATATTACTCAGCCATAAAAAA	ACT
rs7148685	TTGAGACCGTCTATTCAGATC	ACT
rs1184232	GAATGGAAGAAAATGGTTGCAA	CGT
rs1184233	TGCCAGCCTCTTCAATTAC	ACT
rs1184234	TACCAGCACTTTGGGAGGC	ACG
rs7401998	CCACGCCTGGCTAATTTTTTTT	CGT

dbSNP rs#	Extend Primer	Term Mix
rs176974	CTGGGCAACAAAGCAAGACT	ACG
rs6574390	AAATTAGCTGGGTATGATGGC	ACT
rs176975	AATCTAGGTGGTAGGAGATAC	ACT
rs176976	TATAATTCTTTCAGCTTTTCTGTA	ACT
rs176977	TCAGCCTGGGCAACAAGAG	ACG
rs8013727	CCTAACCATAGAAGATAATTAGAA	ACT
rs176978	ATGTTTTTGTACCTCTTGTTAC	ACG
rs2111829	GAATTTTGCTTGGTGAACAAAAT	ACT
rs176980	GCTATGAACGCCATTTTATGTA	ACT
rs5809848	TGGGTTCTGAAATCCTGCTG	CGT
rs5809849	CGTGTCAAGTTCCTTTTTTTTTTT	ACT
rs4383070	GCCTCCTGAGTAGCTGGG	CGT
rs7493652	TATACCACAAGTAACTGTTAATTT	ACG
rs2112133	CCACAACCTGGCTAATTTTTTGT	CGT
rs1963833	CTGGGTGACAGAGCAAGAC	CGT
rs6574391	TGGAGAAGTGATAAACTC	ACG
rs7155062	ATAACCCTTCAAATGAGCATCA	ACT
rs4899674	GGCAAATGGGCTGGGGAG	ACG
rs8022516	AGGCATTCTTTTGGGTATAGTA	ACG
rs7140838	TCTGAAGAATACCAGACCTCT	CGT
rs7141127	CTGAAGAATACCAGACCTCTC	ACT
rs6574392	CTGGGCACAGCGACTCAC	ACT
rs8003691	TGAAGGCCTCCATGGTATAG	ACT
rs8003979	TCTGAAGCCAGTGAGGAAGT	ACT
rs8010541	GCTAGCTTCAACTCTCCTGAT	ACT
rs8016416	TAACCTCCTTTGACTTGCTTTTT	CGT
rs8016175	GTCTGCAATCCCGGCACCT	ACG
rs7154571	GTGAGGAGCGTCTCTGCC	ACG
rs7158826	TCGCTCCTCACTTCCCAGA	ACG
rs7159310	CATCTGGGAAGTGAGGAGC	ACT
rs7401900	TGAGAACAGGCCATGATGAC	ACT
rs7160355	CCTGCCAAATCCCCCTCTC	ACG
rs2032781	GAGAAAAGCGGGCAGGACT	ACT
rs6574394	CACCCAGCCTATTTGTATAATT	ACT
rs8007598	CTCTTAACACATTTTTTTTACAGCA	ACG
rs2267767	CTGACCTCGTGATCTGCCC	ACT
rs6574395	GGCTCAGGCGATCATCGTA	ACG
rs7150066	CTGCCACCCAAAGTGCTGG	ACT
rs7492334	TTGTGTGTGTGTGTGTGTGG	ACT
rs4359361	GCTTAGTACACTTTAAACATGAT	ACT
rs4605089	TCAGGAACACCGCTTAATTTTT	ACG
rs7146446	CAAGACCTCTTTAAGTAATACTC	ACG
rs4346144	AGACCTCTTTAAGTAATACTCC	ACT
rs7148078	GGCTTGGGTACGGGAAGC	CGT
rs7148286	CATTAAGCTTGCCAGAAAATCA	ACG
rs3783980	CATCTTCTCTGCCTCCCA	ACG
rs1549119	CTTCTCTGCCTCCCATAAAT	CGT
rs1984925	CAGGCACGTGCCACCACA	ACG
rs1477261	AGGAGGAGCCCAAATATGAAA	CGT

dbSNP rs#	Extend Primer	Term Mix
rs8016447	CACACCTGGCCATGCTTCC	ACT
rs7494044	CCTGGCCATGCTTCCGTATT	ACG
rs2023288	AATTGTGATTGATTGATTGCGAT	CGT
rs7151685	GTGAGCCACCACATCATCTG	ACT
rs2112135	TCAGGTGATCCTCCTGCCT	ACG
rs2161088	CCAATCACAGCCCACTGCA	ACT
rs4903638	GCCAGAGTGGTCTCCAAC	ACT
rs1477262	AGAGCTCAAGCTGATGTCCT	ACT
rs1477263	TTTTCCTGTTGAGTTCGCATG	ACT
rs1477264	ACCACCTCAGTTTTGCTGTTT	ACG
rs2277917	CCTTGATAACCGCTTGGTCT	ACT
rs2277918	AAAAGCTTCCCGGGGACAG	CGT
rs2277919	AGCTTCCCGGGGACAGCT	ACT
rs1978416	TGAGACTAGCTAATGGAGAGT	ACG
rs3759728	AGCAAATCTACTGCAAACGTG	CGT
rs6574399	AAGTAGAGCTGCTCCACC	CGT
rs7155336	GAAGACTCGGTCTAAAAAAAAA	ACT
rs7156186	GCCACTGCACCTGGCCG	ACT
rs7142390	TGGTACTGGCATAAGGATAGA	ACG
rs7145875	CACAAAACCTTAACTTTTGATTTA	ACT
rs8014635	CAAGAACACTGGTTTTGGTTTT	ACT
rs8015938	CTCAAGTGATCTGCCTGCC	ACT
rs8015313	GATTCTGTACCTGGTTGATCAT	ACT
rs8006315	AACATGGTGAAGCCCCATCT	CGT
rs6574400	GAGATCGCCAGAGACACCA	ACG
rs7140816	TGAGACTCTGTCTCAAATACTA	CGT
rs4566078	CTCAGCTCACTGCAACCTC	ACG
rs7141050	AGCACATAGTAAGTGCCCTAT	ACT
rs3049356	GAATAGTGGAAGGTATTGAAATA	ACT
rs4903639	GAGACTCCGTCTCAAAAAAAAAA	CGT
rs4903641	GGCAACAGAGCGAGACTCC	ACT
rs2364838	CCAGCTACTTGTGAGGCCAA	ACT
rs2364839	AGCCAGACGTGGTGGCAC	ACT
rs4632066	GAGATGGAGGGGGAGCCT	ACT
rs2112136	GGGACTAAGGCTCGCATCC	ACT
rs4641655	GGATTTCTGGGTCCCACTC	ACG
rs4635269	AGCCACCGCGCCCGGCC	ACT
rs4570764	GTGATTATTGGCCGGGCGC	ACT
rs759808	TGCACCACACAGCCTGGG	CGT
rs7150531	AGCAAAGTTAATGGGAGGCC	ACT
rs7154968	AACAAACCTGCATATGTACCC	ACT
rs7146657	CACCCACCAACCCCGCCC	ACT
rs7145859	CGGGAGGTGGAGCTTGCA	ACT
rs4903643	GCTCCCTTCTGTCTACTGC	ACT
rs717682	AGGCTGAGGCAGGAGAATC	ACT
rs717683	AAAAGGTGGAGGCCAAAGAC	ACT
rs1477259	CGGAATAATTATATCTGCCTCT	ACT
rs8019064	CAGAGGCAGATATAATTATTCC	ACT
rs8018971	GTCACTCAGGCTGGAGTGC	CGT

dbSNP rs#	Extend Primer	Term Mix
rs1477260	GACGAGGAGGAAAGCCATC	ACT
rs5809851	CACAGCAGTGTCTTTTTTTTTTT	ACT
rs1985149	TTCTTCTCCCTCAGCCTCC	ACG
rs1008988	GGGGATGACCTCTCTGGAG	ACT
rs1008989	GCCAGCTTGGCAGATTGAG	CGT
rs8018222	TGCTGAACGCTGGTCCCC	CGT
rs1006040	TGGAGTGCACTGGCAAGAC	ACG
rs1006039	CATAGCCAGACCCTATGAGA	ACG
rs1006038	ACTGTGCTCAGTCTATGCTG	ACG
rs8009784	ATGCTTTGCCTTAAAGTGGTG	ACT
rs4903644	GCCTGGGCAACAGAGCAAG	ACT
rs7149496	GATTCTGTAAGTCTGGTATGAG	ACT
rs6574402	CTGACAAGAAAATGACTGCATA	ACT

Genetic Analysis

[0269] Allelotyping results are shown for cases and controls in Table 41. The allele frequency for the A2 allele is noted in the fifth and sixth columns for osteoarthritis case pools and control pools, respectively, where “AF” is allele frequency. The allele frequency for the A1 allele can be easily calculated by subtracting the A2 allele frequency from 1 (A1 AF = 1-A2 AF). For example, the SNP rs7143926 has the following case and control allele frequencies: case A1 (A) = 0.75; case A2 (T) = 0.25; control A1 (A) = 0.71; and control A2 (T) = 0.29, where the nucleotide is provided in paranthesis. Some SNPs are labeled “untyped” because of failed assays.

TABLE 41

dbSNP rs#	Position in SEQ ID NO: 6	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs7143926	218	76161268	A/T	0.25	0.29	0.216
rs1549071	1440	76162490	C/T	0.15	0.20	0.098
rs8012858	1442	76162492	C/T	0.93	0.95	0.335
rs7155611	2611	76163661	C/T	0.02	0.02	0.949
rs176941	4317	76165367	A/C	0.31	0.35	0.271
rs176942	4724	76165774	A/G	0.02	0.02	0.911
rs176943	4788	76165838	G/T	0.13	0.18	0.037
rs176944	5202	76166252	G/T	0.09	0.14	0.107
rs4365221	5780	76166830	C/T			
rs3168952	5974	76167024	C/T			
rs176945	6644	76167694	C/G	0.95	0.96	0.801
rs176946	7430	76168480	A/G	0.10	0.15	0.054
rs176947	7938	76168988	C/T	0.10	0.08	0.473
rs176948	8095	76169145	C/T	0.31	0.35	0.132
rs176949	8183	76169233	A/C	0.03	0.02	0.887
rs176950	8312	76169362	C/T	0.78	0.70	0.008
rs176951	8352	76169402	A/C			
rs7156905	9348	76170398	C/T	0.89	0.90	0.794
rs3217197	9378	76170428	-/TCTC	0.29	0.35	0.036
rs2270443	9617	76170667	A/G	0.39	0.34	0.176
rs176952	9727	76170777	C/T	0.17	0.24	0.018
rs176953	9834	76170884	C/T			
rs176954	9899	76170949	G/T	0.43	0.52	0.010
rs176955	10211	76171261	C/T	0.12	0.18	0.028

dbSNP rs#	Position in SEQ ID NO: 6	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs3214416	10377	76171427	-/T	0.91	0.89	0.544
rs176956	10695	76171745	C/T	0.51	0.49	0.492
rs2544566	10729	76171779	C/G			
rs2544567	10730	76171780	C/T			
rs176957	11433	76172483	A/G			
rs176958	11951	76173001	C/G	0.02	NA	NA
rs176959	12697	76173747	C/T	0.30	0.34	0.147
rs1802227	12982	76174032	A/C	0.92	0.95	0.332
rs176961	14419	76175469	C/T	0.51	0.47	0.158
rs176962	14501	76175551	C/T	0.82	0.79	0.192
rs7401285	14983	76176033	A/C			
rs176963	15280	76176330	C/T	0.51	0.46	0.155
rs176964	15475	76176525	A/G	0.53	0.49	0.197
rs4903631	15888	76176938	A/G			
rs4903632	15976	76177026	A/T			
rs176965	16307	76177357	A/C	0.55	0.52	0.368
rs4903633	16442	76177492	A/C	0.83	0.83	0.970
rs176966	17255	76178305	C/T			
rs176968	18948	76179998	G/T	0.23	0.27	0.246
rs176969	19435	76180485	A/T	0.14	0.20	0.052
rs176970	19753	76180803	C/T	0.35	0.38	0.328
rs7149198	20021	76181071	C/T			
rs7147918	20022	76181072	A/C			
rs7148685	20503	76181553	A/G	0.19	0.18	0.669
rs1184232	20590	76181640	G/T	0.16	0.19	0.316
rs1184233	21804	76182854	G/T	0.36	0.36	0.895
rs1184234	21919	76182969	C/T	0.36	0.35	0.797
rs7401998	21990	76183040	A/T			
rs176974	22412	76183462	A/G			
rs6574390	22536	76183586	C/T			
rs176975	23432	76184482	A/G	0.18	0.23	0.147
rs176976	23468	76184518	G/T	0.86	0.80	0.087
rs176977	23772	76184822	C/T	0.42	0.41	0.794
rs8013727	24325	76185375	C/T			
rs176978	24773	76185823	C/T	0.10	0.12	0.512
rs2111829	26274	76187324	C/T	0.02	NA	
rs176980	27440	76188490	C/G	0.79	0.73	0.018
rs5809848	28561	76189611	-/ACAG	0.11	0.16	0.091
rs5809849	30071	76191121	-/A	0.60	0.57	0.355
rs4383070	31764	76192814	A/T			
rs7493652	33008	76194058	C/T			
rs2112133	35310	76196360	A/T			
rs1963833	35460	76196510	A/C			
rs6574391	37112	76198162	A/G	0.69	0.63	0.064
rs7155062	37285	76198335	A/G	0.17	0.18	0.878
rs4899674	37747	76198797	C/T	0.57	0.52	0.201
rs8022516	38057	76199107	C/T	0.57	0.51	0.135
rs7140838	38859	76199909	A/C	0.17	0.17	0.957
rs7141127	38860	76199910	A/G			
rs6574392	39525	76200575	A/G	0.27	0.32	0.099
rs8003691	40216	76201266	A/G	0.70	0.63	0.029
rs8003979	40281	76201331	C/T	0.10	0.15	0.024
rs8010541	41453	76202503	C/G	0.38	0.38	0.993
rs8016416	42091	76203141	A/T	0.09	0.14	0.035
rs8016175	42513	76203563	A/G			
rs7154571	42935	76203985	C/T			
rs7158826	42985	76204035	A/G			
rs7159310	43003	76204053	A/G	0.62	NA	
rs7401900	43281	76204331	A/G			
rs7160355	43716	76204766	C/T			
rs2032781	43866	76204916	A/G	0.80	0.74	0.047
rs6574394	44234	76205284	G/T	0.61	0.54	0.091
rs8007598	44596	76205646	A/G	0.09	0.10	0.734
rs2267767	44871	76205921	C/T			

dbSNP rs#	Position in SEQ ID NO: 6	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs6574395	45005	76206055	A/G	0.10	0.14	0.203
rs7150066	45282	76206332	A/C	0.91	NA	
rs7492334	47178	76208228	A/C			
rs4359361	47816	76208866	G/T			
rs4605089	47887	76208937	A/G			
rs7146446	48134	76209184	C/T	0.09	0.09	0.981
rs4346144	48135	76209185	A/G	0.83	0.85	0.368
rs7148078	48276	76209326	G/T	0.44	0.50	0.098
rs7148286	48400	76209450	C/T	0.96	0.96	0.893
rs3783980	48798	76209848	A/G	0.15	0.20	0.073
rs1549119	48803	76209853	A/T	0.18	0.25	0.027
rs1984925	49146	76210196	C/T	0.04	0.04	0.882
rs1477261	49969	76211019	A/T			
rs8016447	51059	76212109	A/G	0.10	0.15	0.049
rs7494044	51064	76212114	C/T			
rs2023288	53285	76214335	A/T	0.97	0.98	0.774
rs7151685	54560	76215610	C/T			
rs2112135	54748	76215798	A/G	0.05	NA	
rs2161088	54785	76215835	C/G			
rs4903638	55102	76216152	C/G	0.59	0.59	0.975
rs1477262	55644	76216694	A/G	0.12	0.17	0.040
rs1477263	55705	76216755	G/T	0.18	0.23	0.057
rs1477264	55841	76216891	A/G	0.45	0.42	0.271
rs2277917	56623	76217673	C/G	0.30	0.36	0.039
rs2277918	56825	76217875	A/C	0.49	0.45	0.232
rs2277919	56827	76217877	A/G	0.20	0.17	0.310
rs1978416	56892	76217942	C/T	0.79	0.73	0.074
rs3759728	59150	76220200	A/T	0.13	0.18	0.083
rs6574399	59958	76221008	A/T	0.33	0.36	0.396
rs7155336	60231	76221281	C/T	0.25	0.28	0.250
rs7156186	60524	76221574	A/G	0.85	0.85	0.965
rs7142390	61871	76222921	C/T			
rs7145875	62226	76223276	C/T			
rs8014635	63230	76224280	G/T	0.07	0.11	0.062
rs8015938	63468	76224518	G/T	0.08	0.07	0.693
rs8015313	63787	76224837	C/T	0.67	0.71	0.135
rs8006315	65732	76226782	A/C			
rs6574400	65989	76227039	A/G	0.75	0.70	0.099
rs7140816	68832	76229882	G/T	0.54	0.48	0.095
rs4566078	69904	76230954	C/T			
rs7141050	70365	76231415	A/G			
rs3049356	70886	76231936	-/TATC	0.64	0.69	0.091
rs4903639	73088	76234138	A/T			
rs4903641	73103	76234153	C/T	0.54	0.66	~0.0001
rs2364838	75934	76236984	C/T			
rs2364839	75966	76237016	C/T	0.18	0.18	0.988
rs4632066	76273	76237323	C/T	0.66	0.66	0.961
rs2112136	77943	76238993	C/T	0.70	0.64	0.064
rs4641655	78466	76239516	C/T	0.52	0.48	0.174
rs4635269	78861	76239911	C/T			
rs4570764	78872	76239922	A/G	0.55	0.68	~0.0001
rs759808	79836	76240886	G/T	0.12	0.18	0.043
rs7150531	80908	76241958	C/T	0.33	0.31	0.491
rs7154968	81509	76242559	C/G	0.03	NA	
rs7146657	83576	76244626	C/T	0.57	NA	NA
rs7145859	83662	76244712	C/G			
rs4903643	83782	76244832	C/T	0.10	0.14	0.074
rs717682	84282	76245332	G/T	0.11	0.13	0.624
rs717683	84444	76245494	A/G	0.79	0.75	0.121
rs1477259	85129	76246179	C/G	0.11	0.16	0.022
rs8019064	85151	76246201	A/G	0.90	0.93	0.192
rs8018971	85296	76246346	A/C			
rs1477260	85809	76246859	C/G	0.12	0.16	0.085
rs5809851	86387	76247437	-/T	0.30	0.30	0.993

dbSNP rs#	Position in SEQ ID NO: 6	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1985149	86494	76247544	A/G	0.22	0.23	0.892
rs1008988	89786	76250836	A/G	0.61	0.58	0.380
rs1008989	89894	76250944	A/T	0.14	0.18	0.172
rs8018222	90122	76251172	G/T			
rs1006040	92067	76253117	A/G	0.13	0.18	0.092
rs1006039	92187	76253237	C/T	0.06	0.10	0.133
rs1006038	92312	76253362	A/G	0.19	0.24	0.114
rs8009784	92824	76253874	G/T	0.13	0.18	0.037
rs4903644	93733	76254783	C/T	0.41	0.38	0.383
rs7149496	96553	76257603	C/G			
rs6574402	96941	76257991	A/C	0.12	0.17	0.037

[0270] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 1F for the discovery cohort. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 1F can be determined by consulting Table 41. For example, the left-most X on the left graph is at position 76161268. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0271] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The generally bottom-most curve is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0272] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is placed at the 3' end of each gene to show the direction of transcription.

Example 10ERG Region Proximal SNPs

[0273] It has been discovered that SNP rs1888475 in v-ets erythroblastosis virus E26 oncogene like (*ERG*) is associated with occurrence of osteoarthritis in subjects. One hundred sixty-six additional allelic variants proximal to rs1888475 were identified and subsequently allelotyped in osteoarthritis case and control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 42. The chromosome positions provided in column four of Table 42 are based on Genome “Build 34” of NCBI’s GenBank.

TABLE 42

dbSNP rs#	Chromosome	Position in SEQ ID NO: 7	Chromosome Position	Allele Variants
rs2898353	21	231	38783681	a/t
rs960818	21	882	38784332	a/g
rs960819	21	960	38784410	a/c
rs2410034	21	1194	38784644	a/c
rs2836437	21	1530	38784980	a/g
rs2836438	21	1673	38785123	a/g
rs2836439	21	2096	38785546	c/t
rs2836440	21	2285	38785735	a/g
rs2226683	21	5873	38789323	c/t
rs2836441	21	7256	38790706	a/g
rs2836442	21	7988	38791438	a/g
rs2836443	21	8222	38791672	g/t
rs2836444	21	8381	38791831	c/t
rs3787906	21	8814	38792264	c/t
rs3838108	21	8915	38792365	-/c
rs2836445	21	9642	38793092	a/g
rs2836446	21	9902	38793352	a/t
rs3787908	21	10619	38794069	a/g
rs2836447	21	10927	38794377	c/t
rs2836448	21	11032	38794482	c/t
rs2836450	21	14377	38797827	c/t
rs2836451	21	15608	38799058	c/t
rs1015022	21	15928	38799378	c/g
rs2836452	21	16296	38799746	a/g
rs2836453	21	17598	38801048	a/t
rs3787909	21	19272	38802722	a/g
rs2836454	21	20084	38803534	a/g
rs2836455	21	20577	38804027	a/t
rs2155718	21	28051	38811501	a/g
rs2836456	21	29466	38812916	a/g
rs2836457	21	29530	38812980	c/t
rs2836458	21	29987	38813437	a/g
rs2032323	21	30012	38813462	c/t
rs2051400	21	30322	38813772	g/t
rs2836459	21	32216	38815666	c/t
rs2836460	21	32516	38815966	c/t
rs2836461	21	32544	38815994	a/g
rs2836462	21	32746	38816196	a/g

dbSNP rs#	Chromosome	Position in SEQ ID NO: 7	Chromosome Position	Allele Variants
rs2836463	21	33137	38816587	g/t
rs2836464	21	33538	38816988	a/g
rs2836465	21	33798	38817248	c/t
rs2836466	21	33802	38817252	a/c
rs2836467	21	33964	38817414	c/t
rs3827204	21	34132	38817582	a/g
rs2836468	21	34210	38817660	c/t
rs3787911	21	34317	38817767	a/g
rs2836469	21	34499	38817949	c/t
rs2836470	21	34753	38818203	a/c
rs2212599	21	34845	38818295	c/t
rs2836472	21	35335	38818785	c/t
rs2836473	21	36423	38819873	c/t
rs1888469	21	36450	38819900	a/g
rs1888470	21	36481	38819931	g/t
rs2032322	21	38447	38821897	c/g
rs2410035	21	38784	38822234	c/t
rs1573332	21	39387	38822837	a/t
rs2836474	21	39458	38822908	c/t
rs2836475	21	39822	38823272	c/g
rs3787914	21	40305	38823755	c/g
rs1888471	21	40869	38824319	c/t
rs1888472	21	40926	38824376	c/t
rs1888473	21	41010	38824460	c/t
rs1888474	21	41134	38824584	c/t
rs2836476	21	41984	38825434	a/g
rs3787916	21	42172	38825622	a/t
rs2836477	21	42753	38826203	g/t
rs970043	21	43011	38826461	c/t
rs2212600	21	43176	38826626	a/g
rs2836478	21	43320	38826770	g/t
rs2836479	21	43381	38826831	a/t
rs1475877	21	44142	38827592	a/g
rs2836480	21	44383	38827833	a/g
rs2836481	21	44726	38828176	c/t
rs2836483	21	45087	38828537	a/g
rs2836484	21	45141	38828591	c/t
rs2836485	21	45359	38828809	c/g
rs2836486	21	45421	38828871	c/t
rs2836487	21	45456	38828906	c/t
rs1893199	21	45467	38828917	c/t
rs2836488	21	45486	38828936	c/t
rs1893200	21	45709	38829159	a/g
rs1893201	21	45716	38829166	a/g
rs2836489	21	47626	38831076	c/t
rs1888475	21	49413	38832863	a/g
rs2836490	21	49796	38833246	c/t
rs2836491	21	49962	38833412	a/g
rs2836492	21	50075	38833525	c/t
rs2836493	21	50093	38833543	a/g
rs2836494	21	50571	38834021	c/t
rs2836495	21	50615	38834065	a/g

dbSNP rs#	Chromosome	Position in SEQ ID NO: 7	Chromosome Position	Allele Variants
rs2898354	21	50780	38834230	a/g
rs3065390	21	50851	38834301	-/ta
rs2836496	21	51459	38834909	a/c
rs2836497	21	53193	38836643	c/t
rs2836498	21	53702	38837152	c/t
rs2836499	21	53736	38837186	a/c
rs2836500	21	53795	38837245	c/t
rs2836501	21	54109	38837559	a/t
rs2836502	21	54126	38837576	c/t
rs2836503	21	54230	38837680	a/c
rs2836504	21	54894	38838344	c/t
rs3787917	21	55455	38838905	a/g
rs2836505	21	55499	38838949	a/g
rs2836506	21	56522	38839972	c/t
rs2836507	21	56662	38840112	c/t
rs2836508	21	56954	38840404	a/g
rs2836509	21	57267	38840717	a/g
rs2836510	21	58282	38841732	a/g
rs2836511	21	58916	38842366	a/c
rs2212601	21	59544	38842994	c/g
rs2212602	21	59666	38843116	c/t
rs2226682	21	59913	38843363	a/t
rs2836512	21	66846	38850296	a/g
rs2836513	21	67245	38850695	g/t
rs1999328	21	67652	38851102	a/c
rs2212603	21	67955	38851405	a/g
rs3787919	21	67966	38851416	a/c
rs2836514	21	68420	38851870	a/g
rs1023153	21	70226	38853676	a/g
rs1023372	21	70810	38854260	c/t
rs2212604	21	72246	38855696	a/g
rs2226684	21	73330	38856780	g/t
rs2212605	21	73457	38856907	c/t
rs2187307	21	74389	38857839	a/g
rs3065412	21	74638	38858088	-/aa
rs2898355	21	74640	38858090	a/c
rs2836518	21	75358	38858808	a/c
rs3838110	21	75952	38859402	-/g
rs2836519	21	76098	38859548	a/g
rs3827207	21	77836	38861286	a/g
rs2836520	21	78449	38861899	a/c
rs2836521	21	78507	38861957	g/t
rs2836522	21	80031	38863481	g/t
rs2836523	21	81695	38865145	c/t
rs2836524	21	82775	38866225	a/g
rs2836525	21	82795	38866245	a/g
rs3833350	21	84611	38868061	-/c
rs2836526	21	84657	38868107	c/t
rs2836527	21	84693	38868143	a/c
rs3834676	21	85020	38868470	-/t
rs2836528	21	85048	38868498	c/t
rs3761364	21	85100	38868550	c/t

dbSNP rs#	Chromosome	Position in SEQ ID NO: 7	Chromosome Position	Allele Variants
rs2836529	21	85325	38868775	a/c
rs2836530	21	85452	38868902	c/t
rs3761366	21	85868	38869318	a/g
rs2836531	21	85936	38869386	a/g
rs2836532	21	85990	38869440	a/t
rs2836533	21	86139	38869589	c/t
rs2836534	21	86497	38869947	c/t
rs2836535	21	87236	38870686	a/g
rs2836536	21	87248	38870698	c/t
rs3827208	21	87533	38870983	c/g
rs715860	21	87912	38871362	a/g
rs717231	21	88108	38871558	g/t
rs2836537	21	88494	38871944	a/c
rs2836538	21	89598	38873048	a/c
rs2836539	21	90235	38873685	a/t
rs2836540	21	91287	38874737	g/t
rs2836541	21	91359	38874809	c/t
rs2836542	21	92384	38875834	a/c
rs2836543	21	92410	38875860	c/t
rs881837	21	92900	38876350	c/t
rs3949052	21	94495	38877945	a/g
rs2065307	21	94512	38877962	a/g
rs3216105	21	97777	38881227	-/a
rs2073427	21	98333	38881783	c/t

Assay for Verifying and Allelotyping SNPs

[0274] The methods used to verify and allelotype the 166 proximal SNPs of Table 42 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 43 and Table 44, respectively.

TABLE 43

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs2898353	ACGTTGGATGAATGTGAATGTGGAGGTAGC	ACGTTGGATGCTCCCTTGCTGGTTTTTTTG
rs960818	ACGTTGGATGTGGGATTTTTCCCAGAAGAG	ACGTTGGATGCTGTGCAGAGAAACATGATG
rs960819	ACGTTGGATGCTGTCTCCCTTCTCTTTATC	ACGTTGGATGCATCATGTTTCTCTGCACAG
rs2410034	ACGTTGGATGTTTAGAGACATTTCTCCTAG	ACGTTGGATGTTAGGATGATGTTAGTTTGG
rs2836437	ACGTTGGATGAGCTTCTGCGATATCAGTGG	ACGTTGGATGTTCTGTGTCAGCACATTCTCC
rs2836438	ACGTTGGATGAACATGTCTTGGCCAAGCTC	ACGTTGGATGCCACTGTGACCTCTGGATTT
rs2836439	ACGTTGGATGCCTAGTGTATAAAGTGATGC	ACGTTGGATGTCCTTTCTAGGCACCAATAC
rs2836440	ACGTTGGATGAGATCCTAACCAACCACAGC	ACGTTGGATGAGGTAGGTAGATACAAGGCC
rs2226683	ACGTTGGATGAATATGGCTCCTATAGACAG	ACGTTGGATGTTTTGGGTCACAAAATCAAG
rs2836441	ACGTTGGATGTTACCTTAATAGTGCTGGCC	ACGTTGGATGACTTTCTGGTCAGAGAGAAG
rs2836442	ACGTTGGATGCAAGGACTCTAGGCTTACAG	ACGTTGGATGGGGACATTTGTAGTCACTTC
rs2836443	ACGTTGGATGGGGCCCCATTACATGTCTAA	ACGTTGGATGTTGCTGTACTTCCTTCGAG
rs2836444	ACGTTGGATGCTGCAACCAGGAATTGTCAG	ACGTTGGATGAGGACCCATAAAGAGGTGTG
rs3787906	ACGTTGGATGTGAAAAGAGCGGAAATCAAC	ACGTTGGATGGTAAGAAAATCATTCTGTGG
rs3838108	ACGTTGGATGATGAATAAGATGGCAGGCTG	ACGTTGGATGAAGCTGCCCAGATAAAACAG

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs2836445	ACGTTGGATGCATTTCCAAAATTAGACGCAG	ACGTTGGATGAAAAAGAGAAAAACAGATGC
rs2836446	ACGTTGGATGGTGCCTTGTCTTATCAAGAG	ACGTTGGATGAGCATCCAAGCCTGGTAATC
rs3787908	ACGTTGGATGAATCACCACACTAGACCAGC	ACGTTGGATGCATGCAAGGGAAATGTGTGC
rs2836447	ACGTTGGATGATCTCCTCTCTTTGCTCTGC	ACGTTGGATGGAGGAAGGTTAGGAGCTAAG
rs2836448	ACGTTGGATGTGTAGGGATGTATAGGGCAG	ACGTTGGATGAAAGAGAGGAGATCCGTCTG
rs2836450	ACGTTGGATGTGTGGGCATCAGATGACAAC	ACGTTGGATGATCCCGTTAAATGCACCGAC
rs2836451	ACGTTGGATGCAGACAAACAACCTGTCACCC	ACGTTGGATGGTATTTCTTTCTCGCCGC
rs1015022	ACGTTGGATGTCGAGCCAGCGTCTTTTATC	ACGTTGGATGGTAACAGTCGTACATTCCGG
rs2836452	ACGTTGGATGATCACTGACACAGTCATGAG	ACGTTGGATGCCAGTAACTTTGCAGGTTTG
rs2836453	ACGTTGGATGTGTATTTCCCAAGATGGCCC	ACGTTGGATGCCTCACTTTCTGATGGAAGC
rs3787909	ACGTTGGATGACTTCTCAGTGTTCTGGCTG	ACGTTGGATGCGTCACTCTCTGTTTCATGG
rs2836454	ACGTTGGATGAGGAATGATTCACAACCTCC	ACGTTGGATGGAATGTTCAAATGTAGGGTGG
rs2836455	ACGTTGGATGGGTCTATTGCTGTGACATTT	ACGTTGGATGCATCCCAATTTTAAAGCAAG
rs2155718	ACGTTGGATGAGAACTCTCACACACAGCTG	ACGTTGGATGTGCCTCTTATTACAGCCCTG
rs2836456	ACGTTGGATGGGGATTGTCTGATCTCCTTG	ACGTTGGATGCCAGCTTTCCTTTGTGCATG
rs2836457	ACGTTGGATGAACTCCTGGAATGAGTCACC	ACGTTGGATGATGCACAAAGGAAAGCTGGG
rs2836458	ACGTTGGATGATCACTTAGAAGCCCAGCAG	ACGTTGGATGTGATGCACACTCACTGAAGC
rs2032323	ACGTTGGATGGTAGCCGCCTTTGAGATGC	ACGTTGGATGAGCACAGAGTCGAGGAGGAG
rs2051400	ACGTTGGATGACAGACCTCAGACCAAAGTC	ACGTTGGATGTTTGTCTTAGAGTAACCCCC
rs2836459	ACGTTGGATGGCAAGAATGTTACTTTCTGG	ACGTTGGATGCCATCAAATAGTTGGTTGTC
rs2836460	ACGTTGGATGCAATATCTGAGTTTCACCCC	ACGTTGGATGGTAGATGAGAATTCCGTGTG
rs2836461	ACGTTGGATGGTTACCCACACGGAATTCTC	ACGTTGGATGCCAGATCCAGGTTCTTTCTG
rs2836462	ACGTTGGATGTCTCCTCCGTATGTCTCCAT	ACGTTGGATGATCCCGGAACTCTCTGTTTC
rs2836463	ACGTTGGATGGCACTATTTGACTTGAGCTC	ACGTTGGATGAATTCAAGCCAGAAAGGCTC
rs2836464	ACGTTGGATGGTCTTTTTTACCCCCAGTAAAG	ACGTTGGATGATAAGCAAAGGACCTTTGG
rs2836465	ACGTTGGATGTGAGCTCTTGTGTTTTGCCC	ACGTTGGATGGAGAATTCTCCAGCCTTCTC
rs2836466	ACGTTGGATGTGAGCTCTTGTGTTTTGCCC	ACGTTGGATGGAGAATTCTCCAGCCTTCTC
rs2836467	ACGTTGGATGGACTCTGCTCATTTCCCTTGG	ACGTTGGATGAAGAGTAGGGGTAGATGCAG
rs3827204	ACGTTGGATGTGAAGATCACACGTGGTGTA	ACGTTGGATGGGGTGAATGCCAAAAGAGAG
rs2836468	ACGTTGGATGTAGAGGCAGGAAAGAGCATG	ACGTTGGATGTTTTTGGCATTACCCCTCTC
rs3787911	ACGTTGGATGTAACCCTCTTCTGGATTTCGG	ACGTTGGATGTCATGTGCTCTGAGAGCATC
rs2836469	ACGTTGGATGATTTCTCTACCTCATCCCCC	ACGTTGGATGGGTTGAAGTCACGTAACAGC
rs2836470	ACGTTGGATGCCACTGTTAATCGTATTGCC	ACGTTGGATGACGGACTGAAAGCCAAATGG
rs2212599	ACGTTGGATGAGGAGTTATTCTTCCCCAAC	ACGTTGGATGCAGTGGTCCATTAAGAATCC
rs2836472	ACGTTGGATGGAGTATCGTTCTCTATCATG	ACGTTGGATGTAAAAGAGTCAGAGCAGGAC
rs2836473	ACGTTGGATGTCTCAGCCAGAGTTTTGACC	ACGTTGGATGAATCAACGCCTCCTCTTCAG
rs1888469	ACGTTGGATGACCACCAGGAAGGGTCTGAA	ACGTTGGATGGAGGATCAGAGGCAGAAAAC
rs1888470	ACGTTGGATGGCGTTGATTGCAGTTTTCTG	ACGTTGGATGTTCTTTGGCCTCCGTGTAAG
rs2032322	ACGTTGGATGTGATACTCTGTTGAGCCTCC	ACGTTGGATGGGGGAGCAGTGATGAGTTAT
rs2410035	ACGTTGGATGAATCACTTGAACCCAGGAGG	ACGTTGGATGTTTTTGAACGGAGTTTCGC
rs1573332	ACGTTGGATGGGGTGAACCTTACAGAGAGG	ACGTTGGATGCTGCCAGACAGTTTTGAGAC
rs2836474	ACGTTGGATGAATTCTGCACAGGAGAGTCC	ACGTTGGATGCAGGAAATGAAGATGTCGCC
rs2836475	ACGTTGGATGAGTTCTACATGGGAAGCTGC	ACGTTGGATGATATCTGTGTCTACAGGCC
rs3787914	ACGTTGGATGGGCTGAAGGCTAAAATCACC	ACGTTGGATGGTCTGAGAAGTAGGAATGGC
rs1888471	ACGTTGGATGACTGAGGCAATTGTGTAGAC	ACGTTGGATGTTGACTTTGTTTTGAGAGGC
rs1888472	ACGTTGGATGTTGCCTCTCAAACAAAGTC	ACGTTGGATGCTATTATTCTGGAAGCAGCC
rs1888473	ACGTTGGATGAGAAAGTTCAGTTCTCAGCC	ACGTTGGATGTGTTTGCTCCTGTGAGTAAC
rs1888474	ACGTTGGATGTGTTATGTGAGTCCAGGGTG	ACGTTGGATGTCTTGTTATGTGGGTGGGTG
rs2836476	ACGTTGGATGTTACCTGTGACCTCATTTGG	ACGTTGGATGGAACACACAACATACGGTAC
rs3787916	ACGTTGGATGAAGGCATCTCAGTCATTCTC	ACGTTGGATGTGAGTTTGACACAAAGAAGC
rs2836477	ACGTTGGATGTTTAGCTCTCCTGGATGATG	ACGTTGGATGCCATGATTAGTGCATGAAGG
rs970043	ACGTTGGATGTATAACTCCCCTCTCTCCTG	ACGTTGGATGAGAGCAGACCCTTATCAGAG

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs2212600	ACGTTGGATGGAAACAGGTGTTCAATTTGGC	ACGTTGGATGTCTGCATGAACCAGTAAGTC
rs2836478	ACGTTGGATGAGCTATTGAGTGTCACTTGC	ACGTTGGATGCAGAAGCTTCTGACTTCAAC
rs2836479	ACGTTGGATGAGTAGCCATCCTAATAGGTG	ACGTTGGATGAGCAAGTGACACTCAATAGC
rs1475877	ACGTTGGATGAATCAACACTCCCCGTGTTC	ACGTTGGATGGGTACCTAGAGTAGTCCAAG
rs2836480	ACGTTGGATGTACCAAACCCACTGTACATC	ACGTTGGATGCATAACCTAACACATTGTGGG
rs2836481	ACGTTGGATGTAAGAAGTTCTTTCTCCCCC	ACGTTGGATGGCTGCTTCTTTTCATAAGAGG
rs2836483	ACGTTGGATGCACTGAGGTAATCTCCAACC	ACGTTGGATGGGTGGAGATATGGCTTGATG
rs2836484	ACGTTGGATGAAGCCCACCAGAGTCATCAA	ACGTTGGATGACTACTGACCAGCTTTCCAG
rs2836485	ACGTTGGATGTTCTAAGTGAAGCCCTCCTC	ACGTTGGATGTACAGCTGTGCAAACAGTTG
rs2836486	ACGTTGGATGCATGGTCTGTTGCCTCTAAG	ACGTTGGATGCCCTAGCATTTTATGCATCC
rs2836487	ACGTTGGATGTGAATACCCACTAGGTCTCG	ACGTTGGATGCCACCACTAAACTTAGAGGC
rs1893199	ACGTTGGATGGGCAACAGACCATGGTTTTG	ACGTTGGATGCTTCCCTTCAACATGCACTG
rs2836488	ACGTTGGATGGGCAACAGACCATGGTTTTG	ACGTTGGATGCTTCCCTTCAACATGCACTG
rs1893200	ACGTTGGATGAGTTAAGTCTTCGCATAACC	ACGTTGGATGCCTCTCACACACTAAATCTTG
rs1893201	ACGTTGGATGGTCTTCGCATAACCAAAACAG	ACGTTGGATGCCTCTCACACACTAAATCTTG
rs2836489	ACGTTGGATGGTCAACCATGGAGCTTGAAC	ACGTTGGATGAGAAGACATGTGGGCTTGTG
rs1888475	ACGTTGGATGACCCCTGGCAAGTGAATTAC	ACGTTGGATGGGGAGGTGGATGTTCTTATC
rs2836490	ACGTTGGATGAAAGGCAGAGCTAAAGCAAG	ACGTTGGATGAGCACAACCCAGCAATGCAG
rs2836491	ACGTTGGATGACAACCTTGGAGTGGAAAGGG	ACGTTGGATGATCCAGATGGATTCCACAGC
rs2836492	ACGTTGGATGACATATGGGCATGGAAGAGC	ACGTTGGATGAATCCATCTGGATGGAAGAC
rs2836493	ACGTTGGATGTTAAGAGTTCCGATGCTTGC	ACGTTGGATGGTAATCTGGACTTCTCTTCC
rs2836494	ACGTTGGATGGTGCATTCAATTTGAATTGCTG	ACGTTGGATGCAGTCTTACTTAAACTGAC
rs2836495	ACGTTGGATGGAATTTAACGAACTTCAGC	ACGTTGGATGGGATATTTTCAGGATATCTG
rs2898354	ACGTTGGATGTGTAAACAAACCTGCACATCC	ACGTTGGATGGGTACTTTCCAAATATCTGC
rs3065390	ACGTTGGATGCGAGACTCCATCTCAAAAAG	ACGTTGGATGTGGAAAGTACCAATAGCTTC
rs2836496	ACGTTGGATGTGGAGCTTAATGTGTTCTCTG	ACGTTGGATGGTTAGCCATGCATAAGACAG
rs2836497	ACGTTGGATGAGCCGGGATGACTGCTAGAC	ACGTTGGATGAGATGAGGCTGAAGAAGTAA
rs2836498	ACGTTGGATGGGTCTTGGGAAAATAGGATG	ACGTTGGATGCACCCTTGCTCTTTCTGAAG
rs2836499	ACGTTGGATGACTAGTCAGAGCACAGTGAG	ACGTTGGATGGCTCTCTCCTTCTTTGACTC
rs2836500	ACGTTGGATGGCTTCTTGGTTAGTAAGAGG	ACGTTGGATGATCAACTCAGGGCTCTTCTC
rs2836501	ACGTTGGATGACTCACAAAGGTTGACCTTG	ACGTTGGATGGAGGTCCAGGTTGAAAGAAC
rs2836502	ACGTTGGATGGAGGTCCAGGTTGAAAGAAC	ACGTTGGATGACTCACAAAGGTTGACCTTG
rs2836503	ACGTTGGATGGAGCAATTATCAACCCTACG	ACGTTGGATGATTCTCCCCCTTCACTCTTG
rs2836504	ACGTTGGATGGAGTCTGGGTATGGAAAGAG	ACGTTGGATGTTCTCTAGAAATGGTGCTGCTG
rs3787917	ACGTTGGATGTTTGGAGGAGGAATGCCTTG	ACGTTGGATGCGCCCACAAACCTAAGAGAA
rs2836505	ACGTTGGATGTTTTGACTGCTCCACTCTG	ACGTTGGATGGCTCTCCCTCATTGTTCTTC
rs2836506	ACGTTGGATGGGCTAAGGGCATCATTTTATC	ACGTTGGATGGTTTGCTGATTCATGGATGC
rs2836507	ACGTTGGATGAGCAAAGGTTCTGGTGTTGG	ACGTTGGATGAAATGATGCCCTTAGCCCAG
rs2836508	ACGTTGGATGGTGTGATGATATTTTTCTCC	ACGTTGGATGTTTCAGGTATTCCTCTTTGC
rs2836509	ACGTTGGATGTAAAGCTTTCTAAGTCAATG	ACGTTGGATGTCATATGATAATGGTCTCTG
rs2836510	ACGTTGGATGCAGGGAGAGATCTAAACAGC	ACGTTGGATGGCCAAAGCTATAACACGTGG
rs2836511	ACGTTGGATGAGAACCTGACTTTTGGAGTG	ACGTTGGATGCTTCCTCATTGGTCAGAGTC
rs2212601	ACGTTGGATGCCAGCCTTTAGAAGTGTGAG	ACGTTGGATGTGGGCTGCTGTAACAAAGTG
rs2212602	ACGTTGGATGACTACAACCAGCCAGAGATG	ACGTTGGATGCACAAACCTTGTGTGAACCC
rs2226682	ACGTTGGATGCCAAGATTGAACCAGGAAAG	ACGTTGGATGCACAAAAGAATTCAGGAGGTG
rs2836512	ACGTTGGATGCCCCAAACTTAGCATCCTG	ACGTTGGATGTGTTCTCCCTGCACTTCAAC
rs2836513	ACGTTGGATGCACTGGGGTTAGCAAGAAAC	ACGTTGGATGGACTGTGATTCACCCTGTCT
rs1999328	ACGTTGGATGAGTTACAGCGCAAATTGAGG	ACGTTGGATGGCCTTTATGACTCCATTTCTC
rs2212603	ACGTTGGATGTGGAGGGTGTCTGTGAGTAC	ACGTTGGATGTCATGGAGCAAGGTCTGTGG
rs3787919	ACGTTGGATGCCATCAGCTAGGATTCATGG	ACGTTGGATGTCTGTGAGTACCCCACAATG
rs2836514	ACGTTGGATGCAGGTCTAACTAACTGATGAC	ACGTTGGATGGCCTCTACTGTTATTTAAGG
rs1023153	ACGTTGGATGTACAAAAGTGACCTAGAGCC	ACGTTGGATGTTCTTGCAGGACATTGTGCC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
rs1023372	ACGTTGGATGCAAATTCCAAAATTCTGGTTG	ACGTTGGATGCTCAGAAGTAACATGTACTC
rs2212604	ACGTTGGATGCAGACTTGAGCATATACCAC	ACGTTGGATGACCCATGTGGGAAAATGTTG
rs2226684	ACGTTGGATGGGTGTTGGAAAAGGAACATC	ACGTTGGATGTTAATGATAGTTCCCCTCAG
rs2212605	ACGTTGGATGATATGAGTGATTTGCATGGG	ACGTTGGATGTGCATATAAGCTGTCTGCAC
rs2187307	ACGTTGGATGCACATCCTGCAGCTTTAACC	ACGTTGGATGCCTGGCACTTTCAAGTAACG
rs3065412	ACGTTGGATGGGCTGAGATAGAATGTGCTC	ACGTTGGATGTCTCCTGCTTTGTTCTGGAG
rs2898355	ACGTTGGATGGGCTGAGATAGAATGTGCTC	ACGTTGGATGTCTCCTGCTTTGTTCTGGAG
rs2836518	ACGTTGGATGCACTTGTTGCTTCTTCCACC	ACGTTGGATGATGCCAACCTTGCTGATGTC
rs3838110	ACGTTGGATGGAAGTAGTGAAGTGTTCCCC	ACGTTGGATGAGCCTCACTGAATCTTAACG
rs2836519	ACGTTGGATGTGTTTCTCCTTCTCACTGGG	ACGTTGGATGAAAGGCTACAGGAACTGAGC
rs3827207	ACGTTGGATGTGTAGTCTGCACCTTCACCT	ACGTTGGATGAGCGGCTGCTGAACATAGAT
rs2836520	ACGTTGGATGCCTGCAAAGGTGTTTGCTTC	ACGTTGGATGGCCACCTAATTTTCTCTC
rs2836521	ACGTTGGATGAAGAATAAGAAGCAAACACC	ACGTTGGATGGTTTTAGGGGAAAGGCATAAG
rs2836522	ACGTTGGATGTGCATCTTTGGTTGTGACAG	ACGTTGGATGGCACATCTACTCTTAGCATG
rs2836523	ACGTTGGATGTCTCTCTTTCTTTTCCCTAC	ACGTTGGATGACTCTCAGTTATGATTTCTC
rs2836524	ACGTTGGATGGTGTGTTGGTAGAAACGTTT	ACGTTGGATGGTCACCCCTTCAGATAATAAG
rs2836525	ACGTTGGATGCAGAGCCGAAAACATAGTTC	ACGTTGGATGGTGTGTTGGTAGAAACGTTT
rs3833350	ACGTTGGATGGTTGTTTCTTTTGTCTTCTAG	ACGTTGGATGGAATCATGTCCTTCAGTAAGC
rs2836526	ACGTTGGATGATTGTGTCCTGTCCTGCTAG	ACGTTGGATGGACGGCTAGAAGACAAAAGG
rs2836527	ACGTTGGATGGTGTGTTTATGTTCTAGCAGG	ACGTTGGATGGATGCCTTTAGGCAAACATG
rs3834676	ACGTTGGATGAAGCTGAAAAGGATGTGCAG	ACGTTGGATGACAGGGCATACTTCTCTATC
rs2836528	ACGTTGGATGCCAAAACATGCGATCTGC	ACGTTGGATGTGGCGCTGAAGTACTCAATG
rs3761364	ACGTTGGATGAAACAGCACAGCTACCATTC	ACGTTGGATGATGAGAAAATGTGTGTGGAG
rs2836529	ACGTTGGATGAGCGGTGTTTTAAAATGTCC	ACGTTGGATGCAGAGCCCCAAAAAAATTTGG
rs2836530	ACGTTGGATGACAGACAGTGGTCAGAACAT	ACGTTGGATGAAAGATGCCTATAATCCAGG
rs3761366	ACGTTGGATGCAGGTGATAAAAAGCAAGTG	ACGTTGGATGGCCATCAGTTCTTTTTTGGC
rs2836531	ACGTTGGATGGCCTTCGAAAATGTCTCAAG	ACGTTGGATGCACTTGCTTTTTTATCACCTG
rs2836532	ACGTTGGATGGAAAGACAGCCTTCGAAAATG	ACGTTGGATGCAATGGCTCTTTGCAGTAAC
rs2836533	ACGTTGGATGTTTCTGACCTCTCACGGTAC	ACGTTGGATGTGCAGATCTGGAGGTAGATG
rs2836534	ACGTTGGATGAGAAGAGGCTGGGAGAGGAT	ACGTTGGATGTGCTGCTCTTAGGATAAGGG
rs2836535	ACGTTGGATGACAGGAGGAGTTGAGTGTTG	ACGTTGGATGTAGAGGCACGGAGAAGATAG
rs2836536	ACGTTGGATGAAAAGCATGGGTACAGGAGG	ACGTTGGATGTAGAGGCACGGAGAAGATAG
rs3827208	ACGTTGGATGGAGGATGAGAGGTACCTGAG	ACGTTGGATGGGGATGATCAAACGTAGT
rs715860	ACGTTGGATGTTCTGGTGGAGGTTTCTTGG	ACGTTGGATGCGAGACATGATCTCAAACCC
rs717231	ACGTTGGATGCAAGAGACTCAAACAGTTGC	ACGTTGGATGTCATAGAAGTTACAGCAGCC
rs2836537	ACGTTGGATGTTGGTGTGTGATCACTCTGG	ACGTTGGATGGAACCTAAGTTTCTCCCAGC
rs2836538	ACGTTGGATGGGTTAGAGCTTACGTAATTC	ACGTTGGATGCTACTTGTGTCACTTCTTTG
rs2836539	ACGTTGGATGTTATCCTCCAAGAGCCTTAG	ACGTTGGATGGGGCAAATGGAGTTCTTATT
rs2836540	ACGTTGGATGCCCAGTTGGTATCAGTGTTG	ACGTTGGATGTGCTGAACATCGTTTGGAGG
rs2836541	ACGTTGGATGCTTGCCTGACACCTTTGTG	ACGTTGGATGGTACTGGCGAAGACATGATG
rs2836542	ACGTTGGATGAGATGAGCCATTTCTACTG	ACGTTGGATGCAGCATGAGAACTGAATGC
rs2836543	ACGTTGGATGAAATGGACTTCTTCAGTAGG	ACGTTGGATGGATACAATTCAACCCATAGC
rs881837	ACGTTGGATGAATGGATGTGGCTCTTGAGG	ACGTTGGATGTATGGAGGGACTTACGAAAG
rs3949052	ACGTTGGATGTTTTCAACGGAAACAGATGC	ACGTTGGATGCCAAGTAAAATATTCAATCCCC
rs2065307	ACGTTGGATGTTTTCAACGGAAACAGATGC	ACGTTGGATGCCAAGTAAAATATTCAATCCCC
rs3216105	ACGTTGGATGACCACCATGCCTGGCTAATT	ACGTTGGATGGGCCTGGACAAAATAGTGAG
rs2073427	ACGTTGGATGTTTTGCTTGGGTGTTCTGCC	ACGTTGGATGGGATTTACACTGGTGTTGGG

TABLE 44

dbSNP rs#	Extend Primer	Term Mix
Rs2898353	TCCTGTCTTCAGTGCTTGATTCTG	CGT
rs960818	AGTAGATAACATAAAGTAACCAGC	ACT
rs960819	GCTATTCACCCTAGCTGTACATAG	ACT
Rs2410034	AAATGTAGCTGTAGTATCTTGAA	ACT
Rs2836437	TTCACACTCAACAACAAACACA	ACT
Rs2836438	TGGAAAGTAAGCTAGACCAAACAG	ACT
Rs2836439	GTATAAAGTGATGCTGCTTGC	ACT
Rs2836440	AACAATTGGGATATGTCTCTCCAC	ACG
Rs2226683	GAGAGTTAATGTGCCCTACTT	ACT
Rs2836441	TAATAGTGCTGGCCATAATGC	ACT
Rs2836442	CTCTAGGCTTACAGTAAACAC	ACT
Rs2836443	TATAAGTTCAGGGTCACAGGTC	ACT
Rs2836444	TGTGTTCTTGGGGTCGCCT	ACT
Rs3787906	TAATGTAGGTGCTGAGAACTTAG	ACT
Rs3838108	GGCTGATTAAAATTCTGTTTCCCC	ACT
Rs2836445	AGACGCAGTAAAACTTATGGAT	ACG
Rs2836446	GCCTTGTCCTATCAAGAGCCAAAG	CGT
Rs3787908	CATACAGTAGCTGTGGACAGC	ACT
Rs2836447	ATGTATTACATTGAGAACCATGTG	ACT
Rs2836448	TGTATAGGGCAGGGATAAAGAC	ACT
Rs2836450	AACAACAAATTTACTGATATCATC	ACT
Rs2836451	CTGTCACCCATTGACCTCAC	ACT
Rs1015022	CTTTTATCTGCAGTTGCACCC	ACT
Rs2836452	CGGGAAGATGGCTGCCTTC	ACG
Rs2836453	CCAAGATGGCCCAGTAGGA	CGT
Rs3787909	AAATAGTAAAATAAAAAGAGCTCC	ACG
Rs2836454	CACAACCTCCCAAATGAATAAATC	ACT
Rs2836455	TGCTGTGACATTTTAGTGCTTCTG	CGT
Rs2155718	CTCACACACAGCTGGAGTTTA	ACT
Rs2836456	CGTTCTGAAGGTTTTGTGTACA	ACT
Rs2836457	GAGTCACCCGTCCCCTAGA	ACT
Rs2836458	ACAGAAGAGCCAGCCGACA	ACT
Rs2032323	TGCACACTCACTGAAGCCC	ACT
Rs2051400	AAACACTATGTGACGCCACC	ACT
Rs2836459	AGAATGTTACTTTCTGGATTCTAC	ACT
Rs2836460	ATTGTAATTCTCCGTAAAACCC	ACG
Rs2836461	TACCCACACGGAATTCTCATCTAC	ACT
Rs2836462	TCCGTATGTCTCCATCCATCTCA	ACT
Rs2836463	AAACTTAAATTGCTTTAATCAGCT	ACT
Rs2836464	AATATCTTATCACTGCTCCTGTCT	ACG
Rs2836465	GCCCACTTTTGTGTTTGCTTTAG	ACT
Rs2836466	TTTGCCCACTTTTGTGTTTGCT	ACT
Rs2836467	TTAATTTTCTTGTCTCTTTCTGTA	ACT
Rs3827204	CCCTCACATCTTCCCCGC	ACT
Rs2836468	GCAGGAAAGAGCATGGGCATTAAC	ACT
Rs3787911	TACATCCAAAAGCCTGCCAG	ACT
Rs2836469	TCCTGCGAGATCCTGCTCA	ACG

FIG. 10 is a graph showing the results of a PCR amplification reaction. The x-axis represents the number of cycles (1 to 30) and the y-axis represents the fluorescence intensity (0 to 100). The graph shows a typical PCR amplification curve with a baseline, an exponential phase, a linear phase, and a plateau phase. The amplification is specific and efficient, as indicated by the sharp increase in fluorescence intensity during the exponential phase.

dbSNP rs#	Extend Primer	Term Mix
Rs2836470	ACAAGCTTAATGTTTTGTTTCAGA	ACT
Rs2212599	TTCCCCAACAATAGTCAGAAAA	ACT
Rs2836472	TTCTCTATCATGATGCAGTCC	ACT
Rs2836473	GATGATGAACAGGGCTGTGA	ACG
Rs1888469	AAGGGTCTGAAGAGGAGGC	ACT
Rs1888470	GTTTTCTGCCTCTGATCCTCA	ACT
Rs2032322	CCTATAGGTAACGTGGCTTCT	ACT
Rs2410035	AGGCAGAAGTTGCAGTGAAC	ACG
Rs1573332	GAGAGGCCAGAAAGCCTTC	CGT
Rs2836474	GCACAGGAGAGTCCTCAATT	ACG
Rs2836475	CATGGGAAGCTGCTGAACTA	ACT
Rs3787914	ACAGTGTTTGAGCCCTCCTT	ACT
Rs1888471	AACTGACAGAAGAAAGAAAAATAT	ACG
Rs1888472	TGTGTTGGTGTATAAATCAAGATT	ACG
Rs1888473	CAGTTCTCAGCCAGACGATC	ACG
Rs1888474	GAGTCCAGGGTGCTAATTTC	ACG
Rs2836476	GGTGTTAGCCCTGGGTTCTAATAA	ACG
Rs3787916	TCTCTTATGTAAATACAAAGACG	CGT
Rs2836477	CCTCTTAAAATAGCCTGCCTTCA	ACT
rs970043	GCTCCTTGACTCAAGTATTTTC	ACG
Rs2212600	AAAACAACCTTTCTCTCCCAAAC	ACG
Rs2836478	CTTGCTTATCTTCAAGCAGTC	CGT
Rs2836479	CCTAATAGGTGTGAAGTGTAATAA	CGT
Rs1475877	CTCCCCGTGTTCTGCATGC	ACG
Rs2836480	CCCCTGTACATCTTACACTC	ACT
Rs2836481	TCCCCCTGAAATCCCATAGC	ACT
Rs2836483	AGGTAATCTCCAACCAAACCT	ACT
Rs2836484	AGTCATCAAGCCATATCTCCA	ACG
Rs2836485	CTCCTCTGGGACGTCAGC	ACT
Rs2836486	CCTCTAAGTTTAGTGGTGGAT	ACT
Rs2836487	TGTTGGGTTCTACACATTCAA	ACT
Rs1893199	CAGACCATGGTTTTGAATGTG	ACG
Rs2836488	GTAGAACCCAACACAGAGCC	ACG
Rs1893200	AGTCTTCGCATAACCAAAACAGA	ACT
Rs1893201	CGCATAACCAAAACAGAAAAGAAC	ACT
Rs2836489	CAAGAGCTCTTTTCAATTCCAG	ACT
Rs1888475	GACATCAAATGATTCCCCTGT	ACT
Rs2836490	GAGCCAAAGCTTTCCTGATG	ACT
Rs2836491	GTGGAAAGGGCACTGTGGT	ACT
Rs2836492	GGCATGGAAGAGCAAGCATC	ACT
Rs2836493	TCCGATGCTTGCTCTTCCAT	ACT
Rs2836494	TGAAGTTTCGTAAATTCACTACA	ACT
Rs2836495	CTTCAGCAATTCAAATGAATGCAC	ACT
Rs2898354	TCCGGCACATATATCCTGGAAC	ACT
Rs3065390	AAACAAACAAACAAAACAGTGTA	ACT
Rs2836496	GTGTTCTGATGTTTCTGGAGT	CGT
Rs2836497	CTGCTAGACATTGTCAGTCC	ACT
Rs2836498	AATAGGATGAGTCAAAGAAGGAG	ACT
Rs2836499	GAGAAGAGCCCTGAGTTGATAAA	ACT

dbSNP rs#	Extend Primer	Term Mix
Rs2836500	AGAGGATGAGCAATTTTCAGGGA	ACT
Rs2836501	CAAAGGTTGACCTTGTTTTCTAT	CGT
Rs2836502	AAGAACTTACATTTTATGGCTTC	ACT
Rs2836503	GATTTGGGAGCAAGGGAGC	ACT
Rs2836504	AGAGTTAAAGATGACTCTAGGCTC	ACT
Rs3787917	GCAGCCAGAGTGGAGCAGT	ACG
Rs2836505	AAGGCATTCTCCTCCAAATCAC	ACT
Rs2836506	GAAAATCAAATCAGTTTCTACAAC	ACT
Rs2836507	GTGTTGGAATATTGTTGGCCT	ACT
Rs2836508	ATTCTCTACCATTTTATTCTCTTT	ACT
Rs2836509	TTTCTAAGTCAATGTAGGCAAC	ACT
Rs2836510	CAGCTAGTTATCTTACTTCACC	ACT
Rs2836511	AGCAGGTGACAACCCAGACAT	ACT
Rs2212601	TAAGTTTCTGTTGTTTATATGCCA	ACT
Rs2212602	CCAGCCAGAGATGGGATCA	ACG
Rs2226682	GATTGAACCAGGAAAGAAATAGTT	CGT
Rs2836512	AATGCCAGTTGCCATAGGATA	ACG
Rs2836513	ATAAGAAGATGAGTACTATTATTG	ACT
Rs1999328	ATTGAGGGAAGAGTAAATGATTTC	CGT
Rs2212603	TGTCTGTGAGTACCCCAATGAA	ACT
Rs3787919	TCTGTGGCTTCAATGCTGGG	ACT
Rs2836514	ACAGACTTTAACAAAATCACTGA	ACT
Rs1023153	GGGTCATCTCCTTACCTGTCCAA	ACG
Rs1023372	TTCCAAAATTCTGGTTGTGTTTT	ACT
Rs2212604	CTGCCCCTATACATACATAGCTTC	ACG
Rs2226684	AAAAACAATCTGCACAACAAATAT	ACT
Rs2212605	GCAGTGAATATGAACAAAAAAAAA	ACT
Rs2187307	CAGCTTTAACCTCACTCCAC	ACT
Rs3065412	AGTTACAAATCAGGTGGTGCTGG	ACT
Rs2898355	GTTACAAATCAGGTGGTGCTG	ACT
Rs2836518	TAGGAATCGGAGTCAATAATTTT	ACT
Rs3838110	GCTGCACAATCCCCCCCC	CGT
Rs2836519	CCTTCTCACTGGGTTCCTG	ACG
Rs3827207	TATCACCCCTGTGTCCTGC	ACG
Rs2836520	CACAAATAGATTATATATCCTGTT	ACT
Rs2836521	AATAAGAAGCAAACACCTTTGCA	ACT
Rs2836522	CCACCCCTTCAGAGAGTTG	ACT
Rs2836523	TCATATTGGTTGATCGTATTGGTT	ACT
Rs2836524	GATTTTCAGGAATGAACTATGTTTT	ACG
Rs2836525	AGCCGAAAACATAGTTCATTCCTG	ACT
Rs3833350	CTTTTGTCTTCTAGCCGTCAG	ACT
Rs2836526	AGAACATAAAACACAGAAATGCA	ACT
Rs2836527	TTATGTTCTAGCAGGACAGGA	CGT
Rs3834676	AAAAGGATGTGCAGATCGCAT	ACT
Rs2836528	ATCTGCACATCCTTTTCAGCTT	ACG
Rs3761364	CTACCATTCAATTGAGTACTTCAG	ACG
Rs2836529	CTTCAAATGTGGGTTGATACC	ACT
Rs2836530	GGTCAGAACATGCTGCTTTAT	ACT
Rs3761366	GTGATGGCTTCTAAAAATGTAAA	ACG

dbSNP rs#	Extend Primer	Term Mix
Rs2836531	GCATTTGTTACTGCAAAGAGCCAT	ACG
Rs2836532	AGCCTTCGAAAATGTCTCAAG	CGT
Rs2836533	CACACCCATTCCAACCCAAT	ACG
Rs2836534	GCTGAAGGTTTCTGGGAGCA	ACG
Rs2836535	GAGGAGTTGAGTGTTGGAACCA	ACG
Rs2836536	ATGGGTACAGGAGGAGTTGA	ACT
Rs3827208	CACCCACCCCAATCACCC	ACT
rs715860	CTTGTTATCCTTCAGTTTCCA	ACT
rs717231	CTCATTTAGTTTATGTCTTGGTTG	ACT
Rs2836537	GCTCATACGCCCTTGGTCTCTAAT	ACT
Rs2836538	AGCTTACGTAATTCAAATCAAGT	ACT
Rs2836539	TTACACATTTGCACAATGAGGATA	CGT
Rs2836540	GTATCAGTGTTGAATGACTGGT	ACT
Rs2836541	TGACACCTTTGTGAATTGCTGAAC	ACT
Rs2836542	CCATTTCTACTGAAGAAGTCCA	ACT
Rs2836543	CTTCTTCAGTAGGAAATGGCT	ACG
rs881837	GGCTCTTGAGGCCATGCC	ACG
Rs3949052	ACAATTTCTCATGTTGTAAGGATT	ACG
Rs2065307	GGAAACAGATGCCATTTACAATTT	ACG
Rs3216105	GCCTGGCTAATTTTAAAAA	CGT
Rs2073427	CTGCCCCACATGACCCA	ACG

Genetic Analysis

[0275] Allelotyping results from the discovery cohort are shown for cases and controls in Table 45. The allele frequency for the A2 allele is noted in the fifth and sixth columns for osteoarthritis case pools and control pools, respectively, where “AF” is allele frequency. The allele frequency for the A1 allele can be easily calculated by subtracting the A2 allele frequency from 1 (A1 AF = 1-A2 AF). For example, the SNP rs2898353 has the following case and control allele frequencies: case A1 (A) = 0.79; case A2 (T) = 0.21; control A1 (A) = 0.81; and control A2 (T) = 0.19, where the nucleotide is provided in paranthesis. Some SNPs are labeled “untyped” because of failed assays.

TABLE 45

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2898353	231	38783681	A/T	0.21	0.19	0.560
rs960818	882	38784332	A/G	0.59	0.57	0.330
rs960819	960	38784410	A/C	0.13	0.09	0.101
rs2410034	1194	38784644	A/C			
rs2836437	1530	38784980	A/G	0.14	0.14	0.956
rs2836438	1673	38785123	A/G	0.79	0.75	0.077
rs2836439	2096	38785546	C/T	0.70	0.71	0.508
rs2836440	2285	38785735	A/G	0.19	0.18	0.623
rs2226683	5873	38789323	C/T	0.79	0.76	0.312
rs2836441	7256	38790706	A/G	0.12	0.12	0.765
rs2836442	7988	38791438	A/G	0.31	0.30	0.746
rs2836443	8222	38791672	G/T	0.22	0.23	0.728
rs2836444	8381	38791831	C/T	0.19	0.20	0.807
rs3787906	8814	38792264	C/T	0.97	untyped	NA

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs3838108	8915	38792365	-/C	0.58	0.56	0.425
rs2836445	9642	38793092	A/G	0.32	0.35	0.190
rs2836446	9902	38793352	A/T	0.12	0.14	0.274
rs3787908	10619	38794069	A/G			
rs2836447	10927	38794377	C/T	0.68	0.67	0.816
rs2836448	11032	38794482	C/T	0.12	0.14	0.235
rs2836450	14377	38797827	C/T	0.70	0.68	0.460
rs2836451	15608	38799058	C/T	0.92	0.95	0.157
rs1015022	15928	38799378	C/G	0.31	0.36	0.072
rs2836452	16296	38799746	A/G	0.18	0.18	0.822
rs2836453	17598	38801048	A/T	0.02	0.02	0.836
rs3787909	19272	38802722	A/G	0.06	0.03	0.091
rs2836454	20084	38803534	A/G	0.04	0.03	0.397
rs2836455	20577	38804027	A/T	0.17	0.13	0.050
rs2155718	28051	38811501	A/G	0.78	0.78	0.950
rs2836456	29466	38812916	A/G	0.94	0.92	0.569
rs2836457	29530	38812980	C/T			
rs2836458	29987	38813437	A/G	0.48	0.46	0.455
rs2032323	30012	38813462	C/T			
rs2051400	30322	38813772	G/T	0.03	NA	NA
rs2836459	32216	38815666	C/T	0.19	0.17	0.319
rs2836460	32516	38815966	C/T			
rs2836461	32544	38815994	A/G			
rs2836462	32746	38816196	A/G			
rs2836463	33137	38816587	G/T	0.67	0.72	0.032
rs2836464	33538	38816988	A/G	0.67	0.67	0.991
rs2836465	33798	38817248	C/T			
rs2836466	33802	38817252	A/C	0.39	0.40	0.627
rs2836467	33964	38817414	C/T			
rs3827204	34132	38817582	A/G	0.45	0.42	0.213
rs2836468	34210	38817660	C/T	0.13	0.14	0.678
rs3787911	34317	38817767	A/G	0.13	0.12	0.862
rs2836469	34499	38817949	C/T	0.38	0.40	0.250
rs2836470	34753	38818203	A/C	0.73	0.74	0.939
rs2212599	34845	38818295	C/T	0.66	0.64	0.474
rs2836472	35335	38818785	C/T	0.40	0.35	0.071
rs2836473	36423	38819873	C/T	0.53	0.54	0.755
rs1888469	36450	38819900	A/G	0.45	0.49	0.175
rs1888470	36481	38819931	G/T	0.17	0.18	0.623
rs2032322	38447	38821897	C/G	0.50	0.50	0.879
rs2410035	38784	38822234	C/T			
rs1573332	39387	38822837	A/T	0.57	0.58	0.609
rs2836474	39458	38822908	C/T	0.33	0.35	0.564
rs2836475	39822	38823272	C/G	0.17	0.14	0.113
rs3787914	40305	38823755	C/G	0.73	0.73	0.987
rs1888471	40869	38824319	C/T	0.29	0.26	0.175
rs1888472	40926	38824376	C/T	0.62	0.63	0.818
rs1888473	41010	38824460	C/T	0.63	0.65	0.435
rs1888474	41134	38824584	C/T	0.28	0.23	0.099
rs2836476	41984	38825434	A/G	0.46	0.44	0.379
rs3787916	42172	38825622	A/T	0.45	0.43	0.314
rs2836477	42753	38826203	G/T	0.94	0.96	0.196
rs970043	43011	38826461	C/T	0.04	0.04	0.549
rs2212600	43176	38826626	A/G			
rs2836478	43320	38826770	G/T	0.76	0.75	0.914
rs2836479	43381	38826831	A/T	0.44	0.43	0.670
rs1475877	44142	38827592	A/G	0.35	0.32	0.110
rs2836480	44383	38827833	A/G	0.46	0.43	0.153
rs2836481	44726	38828176	C/T	0.42	0.40	0.434
rs2836483	45087	38828537	A/G	0.47	0.45	0.393
rs2836484	45141	38828591	C/T	0.46	0.47	0.671
rs2836485	45359	38828809	C/G	0.16	0.17	0.643
rs2836486	45421	38828871	C/T			
rs2836487	45456	38828906	C/T	0.02	0.03	0.758

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs1893199	45467	38828917	C/T	0.62	0.65	0.220
rs2836488	45486	38828936	C/T	0.25	0.23	0.360
rs1893200	45709	38829159	A/G	0.16	0.14	0.177
rs1893201	45716	38829166	A/G	0.84	0.87	0.060
rs2836489	47626	38831076	C/T	0.29	0.31	0.502
rs1888475	49413	38832863	A/G			
rs2836490	49796	38833246	C/T	0.94	0.93	0.731
rs2836491	49962	38833412	A/G	0.10	0.08	0.219
rs2836492	50075	38833525	C/T	0.20	0.22	0.518
rs2836493	50093	38833543	A/G	0.95	0.94	0.850
rs2836494	50571	38834021	C/T	0.72	0.70	0.536
rs2836495	50615	38834065	A/G	0.82	0.78	0.142
rs2898354	50780	38834230	A/G	0.25	0.25	0.728
rs3065390	50851	38834301	-/TA	0.10	0.11	0.845
rs2836496	51459	38834909	A/C	0.80	0.84	0.064
rs2836497	53193	38836643	C/T	0.65	0.65	0.935
rs2836498	53702	38837152	C/T	0.43	0.44	0.682
rs2836499	53736	38837186	A/C	0.33	0.30	0.169
rs2836500	53795	38837245	C/T			
rs2836501	54109	38837559	A/T	0.36	0.34	0.234
rs2836502	54126	38837576	C/T	0.31	0.29	0.427
rs2836503	54230	38837680	A/C	0.32	0.29	0.194
rs2836504	54894	38838344	C/T	0.51	0.54	0.170
rs3787917	55455	38838905	A/G	0.56	0.60	0.137
rs2836505	55499	38838949	A/G	0.73	0.78	0.022
rs2836506	56522	38839972	C/T	0.52	0.56	0.145
rs2836507	56662	38840112	C/T	0.51	0.54	0.173
rs2836508	56954	38840404	A/G	0.53	0.56	0.376
rs2836509	57267	38840717	A/G	0.35	0.31	0.089
rs2836510	58282	38841732	A/G	0.65	0.59	0.034
rs2836511	58916	38842366	A/C	0.32	0.30	0.315
rs2212601	59544	38842994	C/G	0.45	0.46	0.568
rs2212602	59666	38843116	C/T	0.30	0.28	0.644
rs2226682	59913	38843363	A/T	0.38	0.35	0.164
rs2836512	66846	38850296	A/G	0.94	0.94	0.896
rs2836513	67245	38850695	G/T	0.23	0.22	0.713
rs1999328	67652	38851102	A/C	0.79	0.79	0.973
rs2212603	67955	38851405	A/G	0.73	0.72	0.776
rs3787919	67966	38851416	A/C			
rs2836514	68420	38851870	A/G	0.52	0.54	0.319
rs1023153	70226	38853676	A/G	0.09	0.09	0.985
rs1023372	70810	38854260	C/T	0.83	0.81	0.518
rs2212604	72246	38855696	A/G	0.68	0.71	0.237
rs2226684	73330	38856780	G/T	0.83	0.81	0.462
rs2212605	73457	38856907	C/T	0.82	0.85	0.255
rs2187307	74389	38857839	A/G	0.13	0.13	0.869
rs3065412	74638	38858088	-/AA			
rs2898355	74640	38858090	A/C	0.96	0.94	0.413
rs2836518	75358	38858808	A/C	0.10	0.12	0.261
rs3838110	75952	38859402	-/G	0.66	0.67	0.790
rs2836519	76098	38859548	A/G	0.60	0.61	0.509
rs3827207	77836	38861286	A/G	0.62	0.63	0.575
rs2836520	78449	38861899	A/C			
rs2836521	78507	38861957	G/T	0.07	0.08	0.551
rs2836522	80031	38863481	G/T	0.11	0.08	0.155
rs2836523	81695	38865145	C/T			
rs2836524	82775	38866225	A/G	0.05	0.04	0.321
rs2836525	82795	38866245	A/G	0.11	0.11	0.875
rs3833350	84611	38868061	-/C			
rs2836526	84657	38868107	C/T	0.83	0.86	0.292
rs2836527	84693	38868143	A/C	0.08	0.08	0.936
rs3834676	85020	38868470	-/T	0.80	0.83	0.191
rs2836528	85048	38868498	C/T	0.84	0.87	0.089
rs3761364	85100	38868550	C/T	0.06	0.04	0.159

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2836529	85325	38868775	A/C	0.09	0.06	0.100
rs2836530	85452	38868902	C/T			
rs3761366	85868	38869318	A/G	0.06	0.04	0.179
rs2836531	85936	38869386	A/G	0.49	0.50	0.729
rs2836532	85990	38869440	A/T	0.30	0.29	0.766
rs2836533	86139	38869589	C/T	0.47	0.48	0.751
rs2836534	86497	38869947	C/T	0.87	0.87	0.874
rs2836535	87236	38870686	A/G	0.93	0.92	0.628
rs2836536	87248	38870698	C/T	0.86	0.84	0.474
rs3827208	87533	38870983	C/G	0.51	0.53	0.459
rs715860	87912	38871362	A/G	0.08	0.09	0.627
rs717231	88108	38871558	G/T	0.65	0.67	0.382
rs2836537	88494	38871944	A/C	0.43	0.40	0.239
rs2836538	89598	38873048	A/C			
rs2836539	90235	38873685	A/T	0.98	0.97	0.796
rs2836540	91287	38874737	G/T			
rs2836541	91359	38874809	C/T	0.07	0.06	0.403
rs2836542	92384	38875834	A/C	0.36	0.38	0.418
rs2836543	92410	38875860	C/T	0.54	0.50	0.202
rs881837	92900	38876350	C/T	0.29	0.28	0.639
rs3949052	94495	38877945	A/G			
rs2065307	94512	38877962	A/G			
rs3216105	97777	38881227	-A	0.32	0.28	0.265
rs2073427	98333	38881783	C/T	0.09	0.07	0.242

[0276] The *ERG* proximal SNPs were also allelotyped in the replication cohorts using the methods described herein and the primers provided in Tables 43 and 44. The replication allelotyping results for replication cohort #1 and replication cohort #2 are provided in Tables 46 and 47, respectively.

TABLE 46

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2898353	231	38783681	A/T	0.19	0.19	0.773
rs960818	882	38784332	A/G	0.59	0.57	0.600
rs960819	960	38784410	A/C	0.07	NA	0.132
rs2410034	1194	38784644	A/C			
rs2836437	1530	38784980	A/G	0.14	0.14	0.957
rs2836438	1673	38785123	A/G	0.80	0.77	0.402
rs2836439	2096	38785546	C/T	0.68	0.73	0.089
rs2836440	2285	38785735	A/G	0.20	0.18	0.421
rs2226683	5873	38789323	C/T	0.78	0.76	0.622
rs2836441	7256	38790706	A/G	0.12	0.12	0.946
rs2836442	7988	38791438	A/G	0.30	0.32	0.674
rs2836443	8222	38791672	G/T	0.22	0.25	0.332
rs2836444	8381	38791831	C/T	0.20	0.20	0.908
rs3787906	8814	38792264	C/T	0.97	untyped	NA
rs3838108	8915	38792365	-C	0.58	0.56	0.604
rs2836445	9642	38793092	A/G	0.33	0.37	0.211
rs2836446	9902	38793352	A/T	0.13	0.15	0.481
rs3787908	10619	38794069	A/G			
rs2836447	10927	38794377	C/T	0.67	0.67	0.843
rs2836448	11032	38794482	C/T	0.13	0.15	0.521
rs2836450	14377	38797827	C/T	0.67	0.67	0.989
rs2836451	15608	38799058	C/T	0.92	0.95	0.214
rs1015022	15928	38799378	C/G	0.30	0.36	0.076
rs2836452	16296	38799746	A/G	0.18	0.18	0.982
rs2836453	17598	38801048	A/T	0.02	untyped	NA
rs3787909	19272	38802722	A/G	0.06	0.03	0.110
rs2836454	20084	38803534	A/G	0.03	0.03	0.746
rs2836455	20577	38804027	A/T	0.17	0.12	0.080

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2155718	28051	38811501	A/G	0.78	0.79	0.747
rs2836456	29466	38812916	A/G	0.91	0.91	0.915
rs2836457	29530	38812980	C/T			
rs2836458	29987	38813437	A/G	0.48	0.47	0.626
rs2032323	30012	38813462	C/T			
rs2051400	30322	38813772	G/T	0.02	untyped	NA
rs2836459	32216	38815666	C/T	0.20	0.16	0.278
rs2836460	32516	38815966	C/T			
rs2836461	32544	38815994	A/G			
rs2836462	32746	38816196	A/G			
rs2836463	33137	38816587	G/T	0.67	0.75	0.011
rs2836464	33538	38816988	A/G	0.66	0.68	0.586
rs2836465	33798	38817248	C/T			
rs2836466	33802	38817252	A/C	0.39	0.41	0.507
rs2836467	33964	38817414	C/T			
rs3827204	34132	38817582	A/G	0.45	0.41	0.229
rs2836468	34210	38817660	C/T	0.13	0.14	0.736
rs3787911	34317	38817767	A/G	0.14	0.13	0.856
rs2836469	34499	38817949	C/T	0.37	0.41	0.168
rs2836470	34753	38818203	A/C	0.72	0.73	0.854
rs2212599	34845	38818295	C/T	0.63	0.65	0.636
rs2836472	35335	38818785	C/T	0.41	0.35	0.145
rs2836473	36423	38819873	C/T	0.51	0.54	0.291
rs1888469	36450	38819900	A/G	0.45	0.49	0.281
rs1888470	36481	38819931	G/T	0.17	0.17	0.949
rs2032322	38447	38821897	C/G	0.51	0.53	0.476
rs2410035	38784	38822234	C/T			
rs1573332	39387	38822837	A/T	0.56	0.60	0.279
rs2836474	39458	38822908	C/T	0.33	0.36	0.330
rs2836475	39822	38823272	C/G	0.18	0.13	0.049
rs3787914	40305	38823755	C/G	0.73	0.74	0.977
rs1888471	40869	38824319	C/T	0.31	0.26	0.134
rs1888472	40926	38824376	C/T	0.62	0.65	0.247
rs1888473	41010	38824460	C/T	0.63	0.67	0.210
rs1888474	41134	38824584	C/T	0.28	0.21	0.091
rs2836476	41984	38825434	A/G	0.47	0.44	0.346
rs3787916	42172	38825622	A/T	0.46	0.41	0.171
rs2836477	42753	38826203	G/T	0.94	0.97	0.294
rs970043	43011	38826461	C/T	0.05	0.03	0.331
rs2212600	43176	38826626	A/G			
rs2836478	43320	38826770	G/T	0.75	0.75	0.983
rs2836479	43381	38826831	A/T	0.44	0.43	0.752
rs1475877	44142	38827592	A/G	0.35	0.31	0.166
rs2836480	44383	38827833	A/G	0.45	0.41	0.254
rs2836481	44726	38828176	C/T	0.42	0.39	0.330
rs2836483	45087	38828537	A/G	0.46	0.46	0.797
rs2836484	45141	38828591	C/T	0.45	0.47	0.553
rs2836485	45359	38828809	C/G	0.18	0.18	0.993
rs2836486	45421	38828871	C/T			
rs2836487	45456	38828906	C/T	0.03	0.03	0.955
rs1893199	45467	38828917	C/T	0.61	0.67	0.071
rs2836488	45486	38828936	C/T	0.27	0.23	0.246
rs1893200	45709	38829159	A/G	0.16	0.13	0.203
rs1893201	45716	38829166	A/G	0.83	0.89	0.021
rs2836489	47626	38831076	C/T	0.30	0.31	0.702
rs1888475	49413	38832863	A/G			
rs2836490	49796	38833246	C/T	0.94	0.95	0.662
rs2836491	49962	38833412	A/G	0.10	0.06	0.038
rs2836492	50075	38833525	C/T	0.20	0.22	0.651
rs2836493	50093	38833543	A/G	0.93	0.95	0.397
rs2836494	50571	38834021	C/T	0.73	0.71	0.592
rs2836495	50615	38834065	A/G	0.81	0.77	0.212
rs2898354	50780	38834230	A/G	0.24	0.24	0.827
rs3065390	50851	38834301	-/TA	0.10	0.11	0.743

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2836496	51459	38834909	A/C	0.78	0.86	0.022
rs2836497	53193	38836643	C/T	0.65	0.66	0.733
rs2836498	53702	38837152	C/T	0.44	0.46	0.576
rs2836499	53736	38837186	A/C	0.33	0.29	0.200
rs2836500	53795	38837245	C/T			
rs2836501	54109	38837559	A/T	0.36	0.32	0.167
rs2836502	54126	38837576	C/T	0.31	0.27	0.206
rs2836503	54230	38837680	A/C	0.32	0.28	0.173
rs2836504	54894	38838344	C/T	0.50	0.57	0.033
rs3787917	55455	38838905	A/G	0.56	0.62	0.033
rs2836505	55499	38838949	A/G	0.72	0.81	0.004
rs2836506	56522	38839972	C/T	0.52	0.58	0.093
rs2836507	56662	38840112	C/T	0.51	0.56	0.134
rs2836508	56954	38840404	A/G	0.53	0.58	0.170
rs2836509	57267	38840717	A/G	0.35	0.30	0.136
rs2836510	58282	38841732	A/G	0.62	0.56	0.035
rs2836511	58916	38842366	A/C	0.33	0.30	0.273
rs2212601	59544	38842994	C/G	0.44	0.46	0.675
rs2212602	59666	38843116	C/T	0.29	0.27	0.571
rs2226682	59913	38843363	A/T	0.38	0.33	0.127
rs2836512	66846	38850296	A/G	0.93	0.96	0.261
rs2836513	67245	38850695	G/T	0.23	0.22	0.692
rs1999328	67652	38851102	A/C	0.79	0.80	0.618
rs2212603	67955	38851405	A/G	0.73	0.74	0.676
rs3787919	67966	38851416	A/C			
rs2836514	68420	38851870	A/G	0.51	0.57	0.044
rs1023153	70226	38853676	A/G	0.09	0.09	0.699
rs1023372	70810	38854260	C/T	0.82	untyped	NA
rs2212604	72246	38855696	A/G	0.67	0.73	0.063
rs2226684	73330	38856780	G/T	0.82	0.82	0.992
rs2212605	73457	38856907	C/T	0.83	0.86	0.180
rs2187307	74389	38857839	A/G	0.14	0.13	0.901
rs3065412	74638	38858088	-/AA			
rs2898355	74640	38858090	A/C	0.95	0.93	0.442
rs2836518	75358	38858808	A/C	0.11	0.14	0.248
rs3838110	75952	38859402	-/G	0.65	0.68	0.399
rs2836519	76098	38859548	A/G	0.59	0.64	0.134
rs3827207	77836	38861286	A/G	0.60	0.64	0.205
rs2836520	78449	38861899	A/C			
rs2836521	78507	38861957	G/T	0.08	0.09	0.765
rs2836522	80031	38863481	G/T	0.12	0.07	0.033
rs2836523	81695	38865145	C/T			
rs2836524	82775	38866225	A/G	0.05	0.04	0.539
rs2836525	82795	38866245	A/G	0.12	0.09	0.179
rs3833350	84611	38868061	-/C			
rs2836526	84657	38868107	C/T	0.83	0.85	0.536
rs2836527	84693	38868143	A/C	0.08	0.07	0.444
rs3834676	85020	38868470	-/T	0.79	0.82	0.270
rs2836528	85048	38868498	C/T	0.82	0.86	0.130
rs3761364	85100	38868550	C/T	0.08	0.05	0.132
rs2836529	85325	38868775	A/C	0.09	0.07	0.214
rs2836530	85452	38868902	C/T			
rs3761366	85868	38869318	A/G	0.07	0.04	0.259
rs2836531	85936	38869386	A/G	0.49	0.50	0.741
rs2836532	85990	38869440	A/T	0.30	0.30	0.921
rs2836533	86139	38869589	C/T	0.48	0.48	0.843
rs2836534	86497	38869947	C/T	0.86	0.89	0.374
rs2836535	87236	38870686	A/G	0.91	0.91	0.933
rs2836536	87248	38870698	C/T	0.86	0.86	0.945
rs3827208	87533	38870983	C/G	0.51	0.55	0.183
rs715860	87912	38871362	A/G	0.07	0.07	0.893
rs717231	88108	38871558	G/T	0.65	0.68	0.506
rs2836537	88494	38871944	A/C	0.43	0.39	0.251
rs2836538	89598	38873048	A/C			

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2836539	90235	38873685	A/T	0.98	0.98	0.910
rs2836540	91287	38874737	G/T			
rs2836541	91359	38874809	C/T	0.09	0.06	0.324
rs2836542	92384	38875834	A/C	0.37	0.41	0.365
rs2836543	92410	38875860	C/T	0.54	0.55	0.863
rs881837	92900	38876350	C/T	0.30	0.28	0.673
rs3949052	94495	38877945	A/G			
rs2065307	94512	38877962	A/G			
rs3216105	97777	38881227	-I/A	0.31	0.29	0.603
rs2073427	98333	38881783	C/T	0.09	0.06	0.249

TABLE 47

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2898353	231	38783681	A/T	0.22	0.21	0.629
rs960818	882	38784332	A/G	0.59	0.55	0.351
rs960819	960	38784410	A/C	0.12	0.01	
rs2410034	1194	38784644	A/C			
rs2836437	1530	38784980	A/G	0.14	0.14	0.989
rs2836438	1673	38785123	A/G	0.78	0.71	0.047
rs2836439	2096	38785546	C/T	0.72	0.68	0.265
rs2836440	2285	38785735	A/G	0.18	0.19	0.789
rs2226683	5873	38789323	C/T	0.80	0.77	0.342
rs2836441	7256	38790706	A/G	0.11	0.12	0.559
rs2836442	7988	38791438	A/G	0.32	0.28	0.269
rs2836443	8222	38791672	G/T	0.23	0.21	0.504
rs2836444	8381	38791831	C/T	0.19	0.19	0.829
rs3787906	8814	38792264	C/T	0.97	untyped	
rs3838108	8915	38792365	-I/C	0.58	0.55	0.526
rs2836445	9642	38793092	A/G	0.30	0.32	0.722
rs2836446	9902	38793352	A/T	0.11	0.14	0.425
rs3787908	10619	38794069	A/G			
rs2836447	10927	38794377	C/T	0.68	0.68	0.908
rs2836448	11032	38794482	C/T	0.11	0.14	0.302
rs2836450	14377	38797827	C/T	0.73	0.70	0.314
rs2836451	15608	38799058	C/T	0.93	0.94	0.499
rs1015022	15928	38799378	C/G	0.33	0.35	0.527
rs2836452	16296	38799746	A/G	0.17	0.18	0.750
rs2836453	17598	38801048	A/T	0.02	0.02	0.934
rs3787909	19272	38802722	A/G	0.05	0.04	0.546
rs2836454	20084	38803534	A/G	0.05	0.03	0.379
rs2836455	20577	38804027	A/T	0.17	0.15	0.472
rs2155718	28051	38811501	A/G	0.79	0.78	0.704
rs2836456	29466	38812916	A/G	0.97	0.94	0.174
rs2836457	29530	38812980	C/T			
rs2836458	29987	38813437	A/G	0.48	0.45	0.532
rs2032323	30012	38813462	C/T			
rs2051400	30322	38813772	G/T	0.04	0.02	0.476
rs2836459	32216	38815666	C/T	0.19	0.18	0.921
rs2836460	32516	38815966	C/T			
rs2836461	32544	38815994	A/G			
rs2836462	32746	38816196	A/G			
rs2836463	33137	38816587	G/T	0.68	0.68	0.988
rs2836464	33538	38816988	A/G	0.69	0.66	0.430
rs2836465	33798	38817248	C/T			
rs2836466	33802	38817252	A/C	0.39	0.39	0.948
rs2836467	33964	38817414	C/T			
rs3827204	34132	38817582	A/G	0.45	0.43	0.614
rs2836468	34210	38817660	C/T	0.12	0.12	0.879
rs3787911	34317	38817767	A/G	0.12	0.11	0.901
rs2836469	34499	38817949	C/T	0.38	0.39	0.914

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2836470	34753	38818203	A/C	0.75	0.74	0.960
rs2212599	34845	38818295	C/T	0.71	0.64	0.095
rs2836472	35335	38818785	C/T	0.40	0.36	0.321
rs2836473	36423	38819873	C/T	0.56	0.53	0.433
rs1888469	36450	38819900	A/G	0.45	0.49	0.399
rs1888470	36481	38819931	G/T	0.16	0.19	0.356
rs2032322	38447	38821897	C/G	0.50	0.45	0.190
rs2410035	38784	38822234	C/T			
rs1573332	39387	38822837	A/T	0.58	0.56	0.554
rs2836474	39458	38822908	C/T	0.34	0.33	0.762
rs2836475	39822	38823272	C/G	0.15	0.14	0.817
rs3787914	40305	38823755	C/G	0.73	0.73	0.934
rs1888471	40869	38824319	C/T	0.28	0.27	0.760
rs1888472	40926	38824376	C/T	0.63	0.58	0.302
rs1888473	41010	38824460	C/T	0.63	0.62	0.683
rs1888474	41134	38824584	C/T	0.27	0.26	0.853
rs2836476	41984	38825434	A/G	0.46	0.45	0.838
rs3787916	42172	38825622	A/T	0.44	0.45	0.827
rs2836477	42753	38826203	G/T	0.94	0.95	0.505
rs970043	43011	38826461	C/T	0.04	0.04	0.848
rs2212600	43176	38826626	A/G			
rs2836478	43320	38826770	G/T	0.76	0.75	0.893
rs2836479	43381	38826831	A/T	0.44	0.43	0.801
rs1475877	44142	38827592	A/G	0.35	0.33	0.450
rs2836480	44383	38827833	A/G	0.47	0.44	0.444
rs2836481	44726	38828176	C/T	0.41	0.41	0.999
rs2836483	45087	38828537	A/G	0.48	0.44	0.306
rs2836484	45141	38828591	C/T	0.46	0.46	0.939
rs2836485	45359	38828809	C/G	0.15	0.17	0.483
rs2836486	45421	38828871	C/T			
rs2836487	45456	38828906	C/T	NA	0.03	NA
rs1893199	45467	38828917	C/T	0.63	0.62	0.868
rs2836488	45486	38828936	C/T	0.23	0.22	0.913
rs1893200	45709	38829159	A/G	0.17	0.16	0.653
rs1893201	45716	38829166	A/G	0.85	0.85	0.947
rs2836489	47626	38831076	C/T	0.27	0.30	0.597
rs1888475	49413	38832863	A/G			
rs2836490	49796	38833246	C/T	0.94	0.91	0.196
rs2836491	49962	38833412	A/G	0.09	0.11	0.493
rs2836492	50075	38833525	C/T	0.20	0.21	0.669
rs2836493	50093	38833543	A/G	0.96	0.93	0.211
rs2836494	50571	38834021	C/T	0.70	0.69	0.697
rs2836495	50615	38834065	A/G	0.82	0.80	0.510
rs2898354	50780	38834230	A/G	0.27	0.26	0.846
rs3065390	50851	38834301	-/TA	0.11	0.10	0.936
rs2836496	51459	38834909	A/C	0.81	0.80	0.746
rs2836497	53193	38836643	C/T	0.66	0.64	0.756
rs2836498	53702	38837152	C/T	0.41	0.40	0.844
rs2836499	53736	38837186	A/C	0.32	0.30	0.567
rs2836500	53795	38837245	C/T			
rs2836501	54109	38837559	A/T	0.36	0.36	0.917
rs2836502	54126	38837576	C/T	0.31	0.32	0.738
rs2836503	54230	38837680	A/C	0.32	0.31	0.730
rs2836504	54894	38838344	C/T	0.52	0.50	0.620
rs3787917	55455	38838905	A/G	0.57	0.56	0.759
rs2836505	55499	38838949	A/G	0.74	0.74	0.982
rs2836506	56522	38839972	C/T	0.52	0.53	0.907
rs2836507	56662	38840112	C/T	0.51	0.52	0.785
rs2836508	56954	38840404	A/G	0.53	0.52	0.709
rs2836509	57267	38840717	A/G	0.35	0.33	0.453
rs2836510	58282	38841732	A/G	0.68	0.65	0.457
rs2836511	58916	38842366	A/C	0.32	0.31	0.832
rs2212601	59544	38842994	C/G	0.45	0.47	0.717
rs2212602	59666	38843116	C/T	0.30	0.30	0.994

dbSNP rs#	Position in SEQ ID NO: 7	Chromosome Position	A1/A2 Allele	F A2 Case AF	F A2 Control AF	F p- Value
rs2226682	59913	38843363	A/T	0.39	0.38	0.801
rs2836512	66846	38850296	A/G	0.94	0.91	0.184
rs2836513	67245	38850695	G/T	0.23	0.23	0.949
rs1999328	67652	38851102	A/C	0.80	0.77	0.487
rs2212603	67955	38851405	A/G	0.74	0.70	0.289
rs3787919	67966	38851416	A/C			
rs2836514	68420	38851870	A/G	0.53	0.49	0.363
rs1023153	70226	38853676	A/G	0.08	0.09	0.611
rs1023372	70810	38854260	C/T	0.84	0.81	0.315
rs2212604	72246	38855696	A/G	0.69	0.68	0.641
rs2226684	73330	38856780	G/T	0.85	0.81	0.216
rs2212605	73457	38856907	C/T	0.82	0.82	0.927
rs2187307	74389	38857839	A/G	0.12	0.13	0.685
rs3065412	74638	38858088	-/AA			
rs2898355	74640	38858090	A/C	0.96	0.96	0.893
rs2836518	75358	38858808	A/C	0.10	0.11	0.823
rs3838110	75952	38859402	-/G	0.68	0.65	0.457
rs2836519	76098	38859548	A/G	0.60	0.57	0.357
rs3827207	77836	38861286	A/G	0.64	0.61	0.449
rs2836520	78449	38861899	A/C			
rs2836521	78507	38861957	G/T	0.06	0.07	0.625
rs2836522	80031	38863481	G/T	0.09	0.10	0.810
rs2836523	81695	38865145	C/T			
rs2836524	82775	38866225	A/G	0.05	0.04	0.419
rs2836525	82795	38866245	A/G	0.10	0.14	0.132
rs3833350	84611	38868061	-/C			
rs2836526	84657	38868107	C/T	0.83	0.86	0.342
rs2836527	84693	38868143	A/C	0.08	0.11	0.209
rs3834676	85020	38868470	-/T	0.81	0.84	0.442
rs2836528	85048	38868498	C/T	0.86	0.88	0.350
rs3761364	85100	38868550	C/T	0.04	0.03	0.643
rs2836529	85325	38868775	A/C	0.08	0.06	0.271
rs2836530	85452	38868902	C/T			
rs3761366	85868	38869318	A/G	0.06	0.04	0.473
rs2836531	85936	38869386	A/G	0.49	0.49	0.915
rs2836532	85990	38869440	A/T	0.31	0.28	0.446
rs2836533	86139	38869589	C/T	0.47	0.48	0.810
rs2836534	86497	38869947	C/T	0.88	0.84	0.149
rs2836535	87236	38870686	A/G	0.94	0.92	0.378
rs2836536	87248	38870698	C/T	0.86	0.82	0.311
rs3827208	87533	38870983	C/G	0.51	0.49	0.598
rs715860	87912	38871362	A/G	0.09	0.11	0.463
rs717231	88108	38871558	G/T	0.65	0.67	0.588
rs2836537	88494	38871944	A/C	0.42	0.41	0.694
rs2836538	89598	38873048	A/C			
rs2836539	90235	38873685	A/T	0.97	0.97	0.749
rs2836540	91287	38874737	G/T			
rs2836541	91359	38874809	C/T	0.05	0.05	0.895
rs2836542	92384	38875834	A/C	0.34	0.34	0.998
rs2836543	92410	38875860	C/T	untyped	0.43	NA
rs881837	92900	38876350	C/T	0.29	0.28	0.811
rs3949052	94495	38877945	A/G			
rs2065307	94512	38877962	A/G			
rs3216105	97777	38881227	-/A	0.32	0.28	0.273
rs2073427	98333	38881783	C/T	0.08	0.07	0.700

[0277] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 1G for the discovery cohort. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-

value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 1G can be determined by consulting Table 45. For example, the left-most X on the left graph is at position 38783681. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0278] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The generally bottom-most curve is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0279] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is placed at the 3' end of each gene to show the direction of transcription.

Example 11

Expression of *LRCH1* in Human Chondroblastoma Cells

[0280] Human chondrosarcoma cells were cultured either in monolayers or in a solid alginate matrix to address the possibility that chondrocytes would dedifferentiate in monolayer culture but would retain a chondrocytic phenotype in matrix environments (Lee, D.A., T. Reisler, and D.L. Bader, Expansion of chondrocytes for tissue engineering in alginate beads enhances chondrocytic phenotype compared to conventional monolayer techniques. Acta Orthop Scand, 2003. 74(1): p. 6-15).

Methods

[0281] SW1353 chondrosarcoma cells (ATCC, HTB-94) were propagated in Leibovitz's L-15 medium supplemented with 2 mM L-glutamine, 10% fetal calf serum and penicillin/streptomycin (100U/ml) as per ATCC protocol. Confluent SW1353 cells were made into single cell suspensions by treatment with trypsin-EDTA and were resuspended in 1.2% alginate (Keltone LVCR, Kelco, Chicago, USA) in 0.9% NaCl at a density of 4×10^6 cells/ml (10 million cells per stimuli). Alginate beads of uniform diameter were prepared by dispensing the cell-alginate suspension dropwise through a 22 gauge needle into 100mM CaCl_2 from a height of approximately 2cm. After polymerization (10 minutes),

beads were washed 3 times in PBS and then once with medium. The encapsulated cells were differentiated in a 24 well plate (10 beads/well; 25-50K cells/bead) for 2 weeks under standard conditions with medium changes every 3 days. At the end of 14 days, a few randomly selected beads were stained for the presence of glycosaminoglycans by alcian blue staining suggesting a chondrocytic phenotype [46]. After 14 days, the alginate cultured cells were stimulated with either recombinant human IL1-beta (R&D Systems) or phorbol 12-myristate 15 – acetate (PMA, Sigma) alongside serum-starved controls for 3 hours (PMA) and 24 hours (no serum and IL1-beta). Similar experimental conditions were applied on confluent plates of undifferentiated SW1353 cells to compare the effects of monolayer culture to alginate culture on gene expression. Encapsulated cells were released from the alginate beads by sodium citrate (55mM in 0.15M NaCl) treatment and the expression of target genes plus control genes (matrix metalloproteinases 8 and 13) was determined by mRNA isolation (Dynabeads oligo dT(25), Dynal Biotech), followed by cDNA synthesis (Superscript II, Invitrogen) and semi-quantitative PCR using standard molecular biology techniques and manufacturer's protocols. PCR was performed using a standard protocol of 30 cycles. *LRCH1* forward primer: 5'-CCAAAGATCAGGACATGGATA-3'; *LRCH1* reverse primer: 5'-TGCTGTTTGTGGTAGGAGAG-3'; *MMP8* forward primer: 5'-CAATACTGGGCTCTGAGTGG-3'; *MMP8* reverse primer: 5'-GGAAAGGCACCTGATATGC-3'; *MMP13* forward primer: 5'-ATATCTGAACTGGGTCTTCC-3'; *MMP13* reverse primer: 5'-GACAGCATCTACTTTATCACC-3'; *GAPDH* forward primer: 5'-ATCATCTCTGCCCCCTCTG-3'; *GAPDH* reverse primer: 5'-GAGGCATTGCTGATGATCTTG-3'; Single band PCR products were resolved on 2% agarose gels and visualized by ethidium bromide staining. cDNA levels were normalized for cell number differences by the housekeeping gene, GAPDH. Control cDNA is composed of an equimolar mixture of 56 cDNA preparations from various human cell lines and was used to verify that the selected primers only amplified a single predicted product.

Results

[0282] Analysis of *LRCH1* expression in alginate cultured human chondrosarcoma cells treated with inflammatory stimuli, IL1-beta and PMA revealed substantial increases in the expression of the known IL1-beta responsive gene, MMP13 [52], in both IL1-beta and PMA stimulated cells. Interestingly, MMP8 was strongly upregulated by IL1-beta but weakly upregulated by PMA, suggesting that MMP8 may be regulated by different inflammatory stimuli and pathways than MMP13. *LRCH1* expression after IL1-beta and PMA stimulation was unchanged from controls. This suggests that the effect that *LRCH1* has on the etiology of osteoarthritis may be via an inflammatory independent mechanism, possibly involving compressive stress. There were no differences in expression of *LRCH1* or control genes in monolayer cultured SW1353 cells compared to alginate cultured cells suggesting that SW1353 cells retain a chondrocytic phenotype even in monolayer culture conditions (data not shown).

Example 12

In Vitro Production of Target Polypeptides

[0283] cDNA is cloned into a pIVEX 2.3-MCS vector (Roche Biochem) using a directional cloning method. A cDNA insert is prepared using PCR with forward and reverse primers having 5' restriction site tags (in frame) and 5-6 additional nucleotides in addition to 3' gene-specific portions, the latter of which is typically about twenty to about twenty-five base pairs in length. A Sal I restriction site is introduced by the forward primer and a Sma I restriction site is introduced by the reverse primer. The ends of PCR products are cut with the corresponding restriction enzymes (*i.e.*, Sal I and Sma I) and the products are gel-purified. The pIVEX 2.3-MCS vector is linearized using the same restriction enzymes, and the fragment with the correct sized fragment is isolated by gel-purification. Purified PCR product is ligated into the linearized pIVEX 2.3-MCS vector and *E. coli* cells transformed for plasmid amplification. The newly constructed expression vector is verified by restriction mapping and used for protein production.

[0284] *E. coli* lysate is reconstituted with 0.25 ml of Reconstitution Buffer, the Reaction Mix is reconstituted with 0.8 ml of Reconstitution Buffer; the Feeding Mix is reconstituted with 10.5 ml of Reconstitution Buffer; and the Energy Mix is reconstituted with 0.6 ml of Reconstitution Buffer. 0.5 ml of the Energy Mix was added to the Feeding Mix to obtain the Feeding Solution. 0.75 ml of Reaction Mix, 50 μ l of Energy Mix, and 10 μ g of the template DNA is added to the *E. coli* lysate.

[0285] Using the reaction device (Roche Biochem), 1 ml of the Reaction Solution is loaded into the reaction compartment. The reaction device is turned upside-down and 10 ml of the Feeding Solution is loaded into the feeding compartment. All lids are closed and the reaction device is loaded into the RTS500 instrument. The instrument is run at 30°C for 24 hours with a stir bar speed of 150 rpm. The pIVEX 2.3 MCS vector includes a nucleotide sequence that encodes six consecutive histidine amino acids on the C-terminal end of the target polypeptide for the purpose of protein purification. Target polypeptide is purified by contacting the contents of reaction device with resin modified with Ni²⁺ ions. Target polypeptide is eluted from the resin with a solution containing free Ni²⁺ ions.

Example 13

Cellular Production of Target Polypeptides

[0286] Nucleic acids are cloned into DNA plasmids having phage recombination sites and target polypeptides are expressed therefrom in a variety of host cells. Alpha phage genomic DNA contains short sequences known as attP sites, and *E. coli* genomic DNA contains unique, short sequences known as attB sites. These regions share homology, allowing for integration of phage DNA into *E. coli* via directional, site-specific recombination using the phage protein Int and the *E. coli* protein IHF. Integration produces two new att sites, L and R, which flank the inserted prophage DNA. Phage excision from *E. coli* genomic DNA can also be accomplished using these two proteins with the addition of a second phage protein, Xis. DNA vectors have been produced where the

integration/excision process is modified to allow for the directional integration or excision of a target DNA fragment into a backbone vector in a rapid *in vitro* reaction (Gateway™ Technology (Invitrogen, Inc.)).

[0287] A first step is to transfer the nucleic acid insert into a shuttle vector that contains attL sites surrounding the negative selection gene, *ccdB* (e.g. pENTER vector, Invitrogen, Inc.). This transfer process is accomplished by digesting the nucleic acid from a DNA vector used for sequencing, and to ligate it into the multicloning site of the shuttle vector, which will place it between the two attL sites while removing the negative selection gene *ccdB*. A second method is to amplify the nucleic acid by the polymerase chain reaction (PCR) with primers containing attB sites. The amplified fragment then is integrated into the shuttle vector using Int and IHF. A third method is to utilize a topoisomerase-mediated process, in which the nucleic acid is amplified via PCR using gene-specific primers with the 5' upstream primer containing an additional CACC sequence (e.g., TOPO® expression kit (Invitrogen, Inc.)). In conjunction with Topoisomerase I, the PCR amplified fragment can be cloned into the shuttle vector via the attL sites in the correct orientation.

[0288] Once the nucleic acid is transferred into the shuttle vector, it can be cloned into an expression vector having attR sites. Several vectors containing attR sites for expression of target polypeptide as a native polypeptide, N-fusion polypeptide, and C-fusion polypeptides are commercially available (e.g., pDEST (Invitrogen, Inc.)), and any vector can be converted into an expression vector for receiving a nucleic acid from the shuttle vector by introducing an insert having an attR site flanked by an antibiotic resistant gene for selection using the standard methods described above. Transfer of the nucleic acid from the shuttle vector is accomplished by directional recombination using Int, IHF, and Xis (LR clonase). Then the desired sequence can be transferred to an expression vector by carrying out a one hour incubation at room temperature with Int, IHF, and Xis, a ten minute incubation at 37°C with proteinase K, transforming bacteria and allowing expression for one hour, and then plating on selective media. Generally, 90% cloning efficiency is achieved by this method. Examples of expression vectors are pDEST 14 bacterial expression vector with att7 promoter, pDEST 15 bacterial expression vector with a T7 promoter and a N-terminal GST tag, pDEST 17 bacterial vector with a T7 promoter and a N-terminal polyhistidine affinity tag, and pDEST 12.2 mammalian expression vector with a CMV promoter and neo resistance gene. These expression vectors or others like them are transformed or transfected into cells for expression of the target polypeptide or polypeptide variants. These expression vectors are often transfected, for example, into murine-transformed adipocyte cell line 3T3-L1, (ATCC), human embryonic kidney cell line 293, and rat cardiomyocyte cell line H9C2.

[0289] Modifications may be made to the foregoing without departing from the basic aspects of the invention. Although the invention has been described in substantial detail with reference to one or more specific embodiments, those of skill in the art will recognize that changes may be made to the embodiments specifically disclosed in this application, yet these modifications and improvements are within the scope and spirit of the invention, as set forth in the claims which follow. All publications or

patent documents cited in this specification are incorporated herein by reference as if each such publication or document was specifically and individually indicated to be incorporated herein by reference.

[0290] Citation of the above publications or documents is not intended as an admission that any of the foregoing is pertinent prior art, nor does it constitute any admission as to the contents or date of these publications or documents. U.S. patents and other publications referenced herein are hereby incorporated by reference.

Nucleotide and Amino Acid Sequence Examples

[0291] Table A includes information pertaining to the incident polymorphic variant associated with osteoarthritis identified herein. Public information pertaining to the polymorphism and the genomic sequence that includes the polymorphism are indicated. The genomic sequences identified in Table A may be accessed at the http address <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?CMD=search&DB=snp>, for example, by using the publicly available SNP reference number (*e.g.*, rs552). The chromosome position refers to the position of the SNP within NCBI's Genome Build 34, which may be accessed at the following http address: www.ncbi.nlm.nih.gov/mapview/map_search.cgi?chr=hum_chr.inf&query=. The "Contig Position" provided in Table A corresponds to a nucleotide position set forth in the contig sequence (see "Contig Accession No."), and designates the polymorphic site corresponding to the SNP reference number. The sequence containing the polymorphisms also may be referenced by the "Nucleotide Accession No." set forth in Table A. The "Sequence Identification" corresponds to cDNA sequence that encodes associated target polypeptides (*e.g.*, Q96FX2). The position of the SNP within the cDNA sequence is provided in the "Sequence Position" column of Table A. If the SNP falls within an exon, the corresponding amino acid position (and amino acid change, if applicable) is provided as well. The amino acid found to be associated with OA is in bold. Also, the allelic variation at the polymorphic site and the allelic variant identified as associated with osteoarthritis is specified in Table A. All nucleotide and polypeptide sequences referenced and accessed by the parameters set forth in Table A are incorporated herein by reference. Genomic nucleotide sequences for *KIAA0296*, *Chrom 4*, *Chrom 6*, *ELP3*, *LRCH1*, *SNW1* and *ERG* regions are set forth in SEQ ID NO: 1-7, respectively. A polymorphism in Table A designated by "AA" is present in the genomic nucleotide sequence of SEQ ID NO: 28, which follows Table A.

TABLE A

RS_ID	Chromosome	Chrom Position	Contig Accession No. [1]	Contig Position	Nucleotide Accession No. [2]	Sequence Position	Amino Acid Position	Locus	Locus ID	A [3]	Allelic Variability	OA Assoc. Allele
552	3	16276963	Hs3_22673_34:16	16241963	XM_209584	intergenic		ZCSL2	285381	R	[A/G]	A
12904	1	152323489	Hs1_79549_34:1	1556529	NM_004428	mrna-utr		EFNA1	1942	F	[A/G]	A
					NM_018845	locus-region		LOC55974	55974			
2282146	20	49881706	Hs20_11519_34:8	14249192	NM_002827	coding-synon	P303P	PTPN1	5770	R	[C/T]	T
734784	20	44409056	Hs20_11519_34:8	8776542	NM_002251	coding-nonsynon	V489I	KCNS1	3787	R	[G/A]	G
1042164	19	13125398	Hs19_11452_34:1	4527200	NM_004907	coding-nonsynon	V133A	IER2	9592	R	[T/C]	T
749670	16	31124685	Hs16_24968_34:1	2488292	NM_014699	coding-nonsynon	G327E	KIAA0296	9726	F	[C/T]	T
955592	2	85570358	Hs2_22340_34:13	64411756	NM_032213	coding-nonsynon	I70T	RBED1	84173	R	[T/C]	C
1143016	1	2209625	Hs1_4507_34:16	317874	NM_002617	coding-synon	93	PEX10	5192	R	[T/C]	T
755248	1	39408404	Hs1_33153_34:6	1601557	NM_024732	mrna-utr		FLJ14351	79787	R	[G/A]	G
1055055	1	42293810	Hs1_33153_34:6	4486963	NM_173642	coding-synon	308	MGC47816	284716	F	[A/G]	A
835409	1	59157267	Hs1_33153_34:6	21350420	NM_018291	mrna-utr		FLJ10986	55277	F	[T/G]	G
927663	1	155318902	Hs1_79549_34:1	4551942	AL138899	10739		LOC254079	254079	F	[T/G]	G
8162	2	42552684	Hs2_22340_34:13	21394082	NM_004718	mrna-utr		COX7A2L	9167	F	[A/G]	G
831038	2	170404402	Hs2_5560_34:14	20411275	NM_004525	intron		LRP2	4036	F	[C/T]	T
33079	2	231577157	Hs2_5560_34:14	81584030	NM_003113	intron		SP100	6672	R	[G/A]	A
1710880	3	11027339	Hs3_22673_34:16	10992339	NM_003042	mrna-utr		SLC6A1	6529	F	[C/A]	A
1078153	3	102614466	Hs3_5769_34:14	7788711	NM_020357	intron		PCNP	57092	F	[T/A]	A
799570	3	113007639	Hs3_5769_34:14	18181884	NM_145753	intron		PHLDB2	90102	F	[A/G]	G
1282730	3	113026933	Hs3_5769_34:14	18201178	NM_018394	intron		FLJ11342	55347	R	[G/A]	A
1518875	3	188430421	Hs3_5769_34:14	93604666	none	intergenic		none	none	R	[T/C]	C
1568694	4	8584835	Hs4_6464_34:15	505708	NM_003501	intron		ACOX3	8310	R	[G/A]	A
905042	4	16229175	Hs4_6473_34:15	7153650	none	intergenic		none	none	R	[A/T]	A
1957723	4	36919171	Hs4_16453_34:15	4170634	none	intergenic		none	none	R	[G/A]	A
794018	4	40066604	Hs4_16453_34:15	7318067	none	intergenic		none	none	R	[G/A]	G
707723	4	47757791	Hs4_6395_34:10	7544215	NM_006587	UTR/intergenic		PRSC	10699	F	[C/T]	T
893861	4	47872633	Hs4_6395_34:10	7659057	NM_000087	mrna-utr		CNGA1	1259	R	[G/A]	G
1914903	4	125442695	Hs4_16510_34:16	49479005	XM_498978	locus-region		LOC441039	441039	R	[G/A]	A
2062232	4	163485648	Hs4_16762_34:16	24456077	NM_020116	intron		FSTL5	56884	F	[C/T]	T

26609	5	53447781	Hs5_6588_34:13	3996639	NM_019087	intron		ARFRP2	54622	R	[A/T]	T
1370987	5	79365937	Hs5_6870_34:13	8673996	XM_293971	intron		LOC345778	345778	F	[A/G]	A
1012414	5	150535958	Hs5_29448_34:10	11670384	NM_001155	intron		ANXA6	309	R	[G/A]	G
435903	5	156713884	Hs5_23289_34:11	1542547	NM_014376	intron		CYFIP2	26999	R	[G/A]	G
1248	5	156742512	Hs5_23289_34:11	1571175	NM_014376	intron		CYFIP2	26999	F	[T/A]	T
703508	5	169797195	Hs5_23289_34:11	14625858	NM_004137	mrna-utr		KCNMB1	3779	R	[G/A]	A
226465	6	1755892	Hs6_35042_34:3	1750892	NM_001500	intron		GMD5	2762	R	[G/C]	C
241448	6	32904663	NT_007592	23654935	NM_000544	coding-nonsynon	Q687*	TAP2	6891	F	[C/T]	C
763155	6	35240628	Hs6_7749_34:13	25990900	NM_152753	intron		CEGF3	222663	R	[A/C]	A
1040461	6	57102190	Hs6_7749_34:13	47852462	NM_016277	coding-nonsynon	S207G	RAB23	51715	R	[T/C]	C
462832	6	111731861	Hs6_25897_34:13	15855720	NM_002912	intron		REV3L	5980	R	[A/T]	A
804194	6	112053555	Hs6_25897_34:13	16177414	NM_002037	intron		FYN	2534	R	[T/C]	C
1022646	6	112074901	Hs6_25897_34:13	16198760	NM_002037	intron		FYN	2534	F	[A/G]	A
756519	6	170707371	Hs6_7740_34:11	520890	NM_002793	intron		PSMB1	5689	F	[C/T]	T
1042327	6	170735302	NT_007583	548821	NM_003194	coding-synon	N257N	TBP	6908	R	[T/C]	C
8770	6	170743040	Hs6_7740_34:11	556559	NM_002598	mrna-utr		PDCD2	5134	R	[C/T]	C
1569112	7	699341	Hs7_7976_34:14	250677	NM_006869	intron		CENTA1	11033	R	[G/A]	G
1563055	8	27976377	Hs8_23822_34:16	6328752	NM_018091	intron		ELP3	55140	F	[C/T]	T
805623	10	29478204	Hs10_8862_34:15	11449523	none	intergenic		none	none	F	[A/G]	G
1019850	11	83985464	Hs11_34082_34:6	14458185	NM_001364	intron		DLG2	1740	R	[A/T]	A
1599931	12	56545117	Hs12_29578_34:1	20402156	none	intergenic		none	none	F	[A/G]	G
AA	13	29711866			NM_006644	exonic		HSP105B	10808	F	[A/G]	G
912428	13	44965904	Hs13_24680_34:1	28147904	NM_015116	intron		LRCH1 / CHDC1	23143	R	[T/C]	T
279941	13	101396169	Hs13_10109_34:1	16787844	NM_000452	mrna-utr		SLC10A2	6555	F	[T/G]	G
1062230	14	23479277	Hs14_26604_34:1	5409277	NM_014178	mrna-utr		STXBP6	29091	F	[C/T]	C
1859911	14	70531426	Hs14_26604_34:1	52461426	NM_004296	intron		RGS6	9628	R	[T/C]	T
1477261	14	76211019	Hs14_26604_34:1	58141019	NM_012245	intron		SKIIP / SNW1	22938	F	[T/A]	T
1191119	14	98332328	Hs14_26604_34:1	80262328	NM_004434	intron		EML1	2009	R	[G/A]	G
657780	15	60862497	Hs15_10351_34:1	33936998	none	intergenic		none	none	F	[A/G]	A
1393890	15	95036282	Hs15_10431_34:1	12272041	XM_096908	UTR		LOC145945	145945	R	[G/C]	C
1478714	16	7132995	Hs16_10709_34:1	4474136	NM_018723	intron		A2BP1	54715	R	[G/A]	G
868213	16	66996694	Hs16_10655_34:1	15942010	NM_178516	intron		LOC283849	283849	F	[C/T]	C
690115	17	73471192	Hs17_10798_34:1	6766230	NM_178128	mrna-utr		LOC283985	283985	R	[G/A]	G
1465501	18	18066783	Hs18_11123_34:1	1303898	none	intergenic		none	none	F	[A/G]	G

899173	19	14094734	Hs19_11452_34:1	5496536	NM_018154	intron		ASF1B	55723	F	[C/T]	C
10477	20	38236897	Hs20_11519_34:8	2604383	NM_015568	mna-utr		PPP1R16B	26051	F	[C/T]	T
926393	20	38331457	Hs20_11519_34:8	2698943	NM_021931	intron		DHX35	60625	F	[C/T]	C
465271	21	26507612	Hs21_11669_34:9	13247612	none	intergenic		none	none	F	[C/T]	C
1888475	21	38832863	Hs21_11669_34:9	25572863	NM_004449	intron		ERG	2078	F	[A/G]	A
13847	21	44259022	Hs21_11672_34:1	715558	NM_020132	mna-utr		AGPAT3	56894	F	[A/G]	G
738658	22	30168847	Hs22_11677_34:9	11234862	NM_019843	intron		EIF4ENIF1	56478	F	[C/A]	C

- [1] Contig Accession Number which can be found in the NCBI Database:
http address: www.ncbi.nih.gov/entrez/query.fcgi
- [2] Sequence Identification or Nucleotide Accession Number which can be found in the NCBI Database:
http address: www.ncbi.nih.gov/entrez/query.fcgi
- [3] “A” column is the sequence orientation (“F” is forward, “R” is reverse).

AA genomic sequence (SEQ ID NO: 28)

TCATTAGCTTTTTCAGTTTTTCACATTCCTGATACAGACGTAGGAGTGCTCGTATTTTGGATTTTGCATCCAACCTTGTTACTTAGTT
TTAAATTCTGCACA [A/G] AAATGTTCCACTAACTTTTCATCGAAGTTTTTTCCTCCTAAGAAAGGATCAAAAGCTGTTCCAGTA
CCTAATTGGTTGAAACAACAAATAGTCTGGTT

[0292] Following are genomic nucleotide sequences for a *KIAA0296* region (SEQ ID NO: 1), a *chrom 4* region (SEQ ID NO: 2), a *chrom 6* region (SEQ ID NO: 3), a *ELP3* region (SEQ ID NO: 4), a *LRCH1* region (SEQ ID NO: 5), a *SNW1* region (SEQ ID NO: 6), and a *ERG* region (SEQ ID NO: 7). The following nucleotide representations are used throughout: "A" or "a" is adenosine, adenine, or adenylic acid; "C" or "c" is cytidine, cytosine, or cytidylic acid; "G" or "g" is guanosine, guanine, or guanylic acid; "T" or "t" is thymidine, thymine, or thymidylic acid; and "I" or "i" is inosine, hypoxanthine, or inosinic acid. Exons are indicated in italicized lower case type, introns are depicted in normal text lower case type, and polymorphic sites are depicted in bold upper case type. SNPs are designated by the following convention: "R" represents A or G, "M" represents A or C; "W" represents A or T; "Y" represents C or T; "S" represents C or G; "K" represents G or T; "V" represents A, C or G; "H" represents A, C, or T; "D" represents A, G, or T; "B" represents C, G, or T; and "N" represents A, G, C, or T.

KIAA0296 genomic sequence (SEQ ID NO: 1)

>16:31076951-31174000

1	ccccaccccc	caacagctgc	acagtctgga	gcgaatatac	acgcccacca	cccacacacc
61	caagacccaa	tacacttttt	taaactttat	ttttacttct	atztatttat	ttttaattat
121	tttttaaaaa	tctaattaga	gatgaggtct	taggctgggc	acagtggctc	atgcctgtaa
181	ccccagcact	tcgggaggcc	gaggcaggca	gatcacgagg	cgggaggatc	acgaggtcag
241	gagttcRaga	ccagcctggc	caatatgggtg	aaaccccatc	tctgctaaaa	atacaaaaat
301	gagctgggcg	cgggtggtgtg	cacctgtaat	ctcagctact	tgggaggctg	aggcagaatt
361	gtttgaactc	aggaggcgga	tgctgcagtg	agctgagatc	gtgccactgc	actccagtct
421	gggagacaga	gcgagactac	gtctcaaaac	aaacaaacaa	acaaacaaca	acaacaaaaa
481	cagagataag	gtcttggcat	gttgcccagg	ctgggtctcaa	gtcctgggct	caaaggattc
541	tcctgcctca	gcctcccaaa	gtgctaggat	tacaggcgctg	aaccactgca	cccaccctac
601	tttttttttt	tttttttttt	atacaggatc	tcactctgtc	acccgggctg	gagtgcagtg
661	gcaagatcac	tgctgactgt	acccttgacc	tcagggactc	aagtgatcct	cctgcctcag
721	cctcctgagt	agctgggact	acaggagagc	gccagcacac	ctgggtaatt	aagatttttt
781	ttgtagagac	agacgctatg	ttgcccaggc	tgctctcgaa	ctcctggcct	caagtgatac
841	acccttggcc	tcctaaagtg	ctgggatcac	aggcatgagc	cactgcacct	agcctaatat
901	agttaatatc	cccgtcaagg	ctgctcagag	ggcctgagag	gaacaaaggg	ctcagctctg
961	gagagctcca	ccccagcgcc	caatctctct	aaatggcctc	tttcctctcc	atattccacc
1021	acaaggcttg	gagtccagct	tcctgtgacc	ttaagtcacc	attccaaagc	cctgcgatct
1081	caccagaga	ccacaagtga	aataatatta	taatcctgag	aagttagtg	gaccaagatg
1141	gcatgccatc	aagacgctga	gaaacaaaga	ggaagatggg	accagggggc	ccagaagacg
1201	ctggaaccca	cagtattaaa	agctcagaga	ggctgggcac	agtggctcac	acctgtaatc
1261	ccagcacttt	gggaggccaa	ggtgggtgga	tcacttgagc	ccagggggtt	gagaacagcc
1321	tgggcaacat	ggcgaaaccc	agtctctacc	aaaaaatata	caaaaattag	ccaggcatgg
1381	tgggtgcgtgc	cttagtacca	gctacttggg	aggctgaggg	aggaggattg	actgaacctg
1441	agagcacacc	actgcactcc	agcctggatg	acagaaccag	acctgacctc	aaagagaaga
1501	aaaaaaaaaa	aaaaaaaaag	cccagagggg	agggYaccct	caacagtttt	ccagcccctt
1561	ccacatcctt	cctaacctca	cttgatagtg	ttcaagtcct	accttaggca	aggcagaaat
1621	tataggacca	agccgccaaa	tggggaaatt	gagtcacaga	gagaagtaat	gcattattta
1681	agatcccatt	caggactatg	agtcaggggt	ccaagagccc	ttccaccgtg	tgccactcag
1741	agacacagag	taggaggggg	aaggggggtcg	ggtggcaggg	gacaaaagat	gcaggaggca
1801	agcagcagtg	actgaagagg	cagaggctga	catgaaagac	ccaggagcag	agaatctttc
1861	cttatcatct	ccaggggaca	ccactgggca	gggcttggcc	tccggaaaaa	ccctgcattc
1921	cctctgtggg	ttcatcaggg	caccactctc	ctactagctg	ggtttttttt	ttttgttttg
1981	ttttgttttt	gagacagagt	cttactctgt	cacctaggct	ggagtgcaat	ggcgtgatct
2041	cagctcactg	taacctccac	ctcccatgtt	caagcaatcc	tcctgtctca	gcctcccaag
2101	tagctgggat	tacaggcacc	tgccatcatg	cctggctaatt	ttttgtatgt	ttgtagagac

2161	aggggtttcgc	catggttgcc	aggctggtct	ccaactcctg	gcctcaggtg	atctgcctgc
2221	ctcagcctcc	caaagtgtg	ggattacagg	catgagccac	cacaccctgc	ctgagctggg
2281	ttttaacagg	aagaggagaa	gagccaaaac	tcctcacata	gaatcacaca	gcacttgaca
2341	gtttccaacc	tcatcatcac	tgaagttag	agcagccgat	acccaYaaag	atgatctccc
2401	catcccccta	cagttaccca	ctgtgcagag	ggagatccac	acttagagac	aggaagcgat
2461	ttccagaagt	ccatagcaac	tcagtcccag	gaatctaggt	ttcctgacca	gggcatagca
2521	gaaaggggtcc	attcctttcc	ttgcttgtac	cttcacagaa	gcttcctgga	cagagccctg
2581	gggtccagga	gacctgttat	tcattcccgg	ctatgctgag	acttgctgag	tgaccttggg
2641	gactccttct	agagaatata	agttccacga	gtgcaggaat	ttttgtctat	tagtccttga
2701	tgtatctcca	gccctagaac	agtgtttggc	ccatactatg	tgcccaaaaa	atatccatta
2761	aatgactgaa	tggtgctgtg	catgggtggtg	catgcctgta	atcccagcac	tttgggaagc
2821	tgaggcagaa	ggattgctta	agcccaggag	ttagagacca	gcttggaaca	catagtgaga
2881	ccgcatctcg	taaaaatttt	taaaaataaa	aaatgagtga	atatctagat	agccaggatt
2941	agagaagtgt	cacagtcaga	aagcctgaag	cctaaagaag	accaaggaa	caggggcttt
3001	atcctcagat	acatgaaagc	ctgaaattct	gtccacaagt	atttatagag	ggcccgtaat
3061	gttcttggtg	ctgggctagg	aactccccag	attcagttaa	gaacaaagtc	attacctggc
3121	ctcagatgca	aggcaggggc	tgggggggtg	gagtggcagg	gaggcagcgt	gatcaataca
3181	aacacttttc	ttagcctgag	ctgccctgac	atggctctgac	ggctcacaa	gtggtgagtg
3241	cagccgggct	gcagtgttca	aggagggcgc	cggctggccg	cccacctgtc	agaggctgcg
3301	ccagaaggat	gcggaagaag	agatttctgc	cttggtctgag	gtcacttccc	accccagat
3361	tccttgccca	cacaaccctg	caattttctg	acgctgacga	ctcggatcct	attatttccc
3421	gattttcaag	gtcccatgat	gctgacagcc	ccaaatgcta	agtcgtcagt	ccgcccacgc
3481	cctggaccgc	aaagcaataa	aggcgaggtc	agcaagggtc	ctaccacca	ctgcctcgaa
3541	aggcctctgg	gggtggctcg	cgcgcccctc	cccacctcgc	gggggcccgtg	tgggcgtcgc
3601	tcggctcgtt	gggtgccggg	gacgtcgtga	tgagaacggc	gtcccagaga	cggcggtgac
3661	agagccggga	cacgtgacag	tcacagggtc	acattctgcg	gtccacgagt	ttgggaccgg
3721	gctggtcacg	tgacgcggtg	ggggcaccat	ggggtgatgt	gagatgcggg	tgtctcggat
3781	tacgtacaaa	tgacgtattc	ctacccttct	tggcaaccag	atttccgttg	gaagatgcaa
3841	cggttccggt	gacggtagca	agttctcgcg	tcaggcatc	tcgcttccg	ctcggggcgc
3901	aacaacttcc	gactccacct	tcccagcctc	gggcaaggaa	gagacgcgac	catgtgcgca
3961	tgccccgaat	ttatcacgga	ggggcggggc	tgaggctgcg	ggagctggag	cggggaagaa
4021	aagggaattc	caacctgtgg	aaccttgggg	ggtccccggg	gtcggcgcct	tccattgac
4081	tgtgggcggg	gcaagggacg	gagcctctgg	cggctcgtgg	gggtgttggg	gtccgcaggg
4141	ggagggaggg	gagtgtcaga	gtgtgagcgg	ggtacgggaa	ttccaaattt	gagggcctcc
4201	cggctctggc	gccggggagg	gagagctcag	gccgccatgc	gggacaggac	ccacgagctg
4261	agacaggtga	gacgccaggg	cagcggggat	ggggacgggc	ggacgaactg	gaacgcagga
4321	cttctggtct	tcgggatagg	gaggggtggc	tgatggccag	gaaggaaagt	cccgggaagc
4381	tgtgggtcct	gcggggtaag	agccgcagcg	aaacggtggt	gccaatgact	ccgggcctgg
4441	cagggggatg	acagctcgga	cgaagaggac	aaggagcggg	tcgcgctggt	ggtgcacccg
4501	ggcacggcac	ggctggggag	cccggacgag	gagttcttcc	acaaggtaag	gggctggggg
4561	ctccgcctgg	attcgcgagg	gtgtaggagg	acccgaggag	tagcgtgggt	tggagtaccc
4621	catatctctt	tcagccctct	cggtcaccct	ccccagggtc	ggacaattcg	gcagactatt
4681	gtcaaactgg	ggaataaagt	ccaggagttg	gagaaacagc	aggtcaccat	cctggccacg
4741	ccccttcccg	aggagagtga	gtgaaacccc	ggctgcaggg	cgcattgctc	gccccaggga
4801	ttgtgggggt	tgtagtcca	cgcagggtgg	ggccagagtg	gtttgttgag	gtgggggctg
4861	ctgtttggga	gtcttggcct	tctcttattc	aggcatgaag	caggagctgc	agaacctgcg
4921	cgatgagatc	aaacagctgg	ggagggagat	ccgcctgcag	ctgaagggtg	agctcctggg
4981	acctcagaca	gatccttccc	tctgatcctg	ccctgttggt	ggtatatctg	gggagtgtgt
5041	ggcccagaga	agccagtgat	atatccaggt	cacacagcag	gcctgggtct	agcatctgtc
5101	tcctggcctc	caggccattg	tactctccac	agcacaaagt	cgcctctcag	gttctttttat
5161	ttacaatgaa	accatttact	tacacagtta	tcgctgcccc	ctgggcattc	tttgggcagg
5221	gagatggagt	tttgttaggt	ggcctctgca	tacctatggg	aactcagtga	tgtaatgcaa
5281	agaaaaataa	acttactttc	tcctcttaga	ggctcagcct	tagtcatttt	atgataaatt
5341	atatttccct	aaaaatccta	tggagacaag	tacccccaat	acccctgtgt	cttcccacag
5401	ccatagagcc	ccagaaggag	gaagctgatg	agaactataa	ctcgtcaac	acaagaatga
5461	gaaaaaccca	ggtgggtttt	ttttctcaga	aatgaggaca	tttcagcaaa	tgtttcatga
5521	agtattagat	gacagggtga	tgaagggaag	gcctgcagag	atcatggagt	ccaattggat
5581	gacttttcca	aatggggaaa	ctgagctcag	agagagaaag	aacttgctca	aggtcaggaa
5641	gccagggtct	ctgatgctca	gtccgggttat	aacaccctgc	tttattttct	tcatttcaat
5701	aggaagttag	tgtgacccca	gacaagacct	agtcttggct	gtgggacaca	tgttttcttt
5761	tctttttttg	cctcagcctc	ctgaatagct	gggattacag	gcggacaccc	ccatgcccag
5821	ctaatttttg	tagtttttagt	agagactggg	cttcaccatg	ttggccaggc	tggtttccga
5881	ctcctgacct	cagggtgacc	tcctgcctcg	gcctcccaaa	gtgctgaatt	acaggcgtga
5941	gccaccatgc	ccagctggga	cacatgtttt	ctgggagtca	agatgaggag	ttagggttca
6001	atagggggata	aagacattac	tcacgtggga	cctggtggct	aacggcgctg	cccagggaag
6061	gagagtgaga	agtcataaat	gactggcagg	tttcctatct	atgtgacagg	gacatcctta
6121	gtcccacagg	tggaattcaa	gaagtcagga	agaggaaact	ccttggggca	acactgaaga
6181	ggaactcccc	tggtgtgata	tcttattttt	ttaattatta	ttattttttt	gagatggagt
6241	ctcactctgt	ccctcaggct	ggagtacagt	ggcacaaact	tggctcactg	caacctccac
6301	ctccttcaag	cgattctcct	gcctcagcct	cacgagtagc	tgggattaca	ggtgtgcacc
6361	accacacctg	gctaattttt	tatatattttg	gtagaaatga	ggtttcacct	tgttggccag

6421	gctggtctcg	aactcctgaY	ctcaactgat	ccacctgctt	tggcctcgca	aagtgcctatg
6481	attataggca	tgagccaccg	cgcgcggccc	ctgggggtgat	atcttagtaa	ggagatttgc
6541	agtgatctga	ctggccctct	ctgggtcccc	agtgaggagg	ataccaggag	gtcaggggtg
6601	gagtagttgg	gcccaggggt	cagcagggac	cccagattga	agatggagca	gcttggggcat
6661	cttgggaagg	tgaagctgga	accaggaaag	cagatgtatc	tctggaaaag	gaactccaag
6721	gaatgagcat	atttaaggcc	tcagaagaag	gggcaaggca	gagcagatgc	cccagaacca
6781	gtgtttcttg	ggaagcctgt	ggtggtgatt	ggcatgagtg	gttgagggtc	catgtggggc
6841	tgttgcacct	gtttcgccca	ggcaacatgt	tcatctctag	gcgtaggagc	tgtggtgtag
6901	gcagcgaggt	tggcattcag	caagcattca	gcagttacat	attgggtgcc	tactgtgtgc
6961	cagacctttt	tggaactgtt	taggatacag	cagtgaacca	gtgatccctg	tcctcatgga
7021	acttcccttc	tgggtgtagac	aatcaccata	ataaataagt	gaattattta	gaacataata
7081	agcattaagg	aaaaaagagc	aggggaagag	ggactaagca	tgctggagga	ggtagagttg
7141	cagttgaaag	caggtggagg	aagcttcatt	cagaaggtaa	catctgaaca	agagacttaa
7201	aggtgtttgc	tgggaatgag	cattctaggt	agaaggaaaa	gtgaatgcaa	aggcttaagc
7261	tgagagtgtg	ctttgtctag	ggaggggtaa	ggagaccagt	gtggatgggc	agaggaaggg
7321	aacagtaaga	ggaagtaaga	tcagagaggt	catgggagaa	ggagagatca	tagagggcta
7381	gccaggcacc	gtggctcacg	cctgtaatcc	cagcactttg	gaggctgagg	tgggaggatt
7441	ggttgagccc	aggagtttga	gaccagcctg	ggcaatatag	tgagaccccc	cccccttttt
7501	tttttttccct	ttgagacagg	gtctcactct	gttgcccagg	ctggagtaca	gtggtgccat
7561	ctctgctcac	tgcaacctcc	gcctcctggg	ttcaagccat	tctcttgctt	cagcctccca
7621	agtagctggg	actacaggcg	cccaccactg	caccaagcta	atttctgtac	ttttagtaga
7681	gatgggggtt	caccacgttg	gccaggctgg	tcttgacctc	ctgacctcag	gtgatccacc
7741	tgccctcagcc	tcccaaagtg	ctgggatcac	aggcatgagc	caccgtgcc	ggccaaccct
7801	gtctctatta	aaaataaaaa	tagggcaggt	gcagtggtct	acgcctgtaa	tggaggccga
7861	ggcaggtgga	tcacaagggtc	aagagatcaa	gaccatcctg	gccaacatgg	tgaaacccca
7921	tctctactaa	aaatacaaaa	attagccgtg	cgtgggtggcg	cgtgcctgta	gtcccagcta
7981	ctcgggaggg	tgaggcaaga	gaattgcttg	aaccggggag	gccaagggtg	cagtgagccg
8041	agattgtgcc	actgcactcc	agcctgggca	acaagagtga	aactctgtct	caaaaaacaa
8101	ataataaata	aataaataaa	taaataaata	aataaataaa	taaaaaagat	catggaggac
8161	cacataggcc	tgataagggc	tttggccttt	agtctaagag	aaatggggga	gcctgtcaag
8221	gtcatcacia	ggtgggttaag	gtggcagatc	ccgcataaga	gctcatgcta	tttgctcact
8281	gtactatggg	gttgccgagg	caccgaccgg	gcagggatcc	tcccaggggc	actcagccta
8341	tattcttcat	cttttagcatg	gggtcctgtc	ccagcaattc	gtggagctca	tcaacaagtg
8401	caattcaatg	cagtccgaat	accgggagaa	gaacgtggag	cggattcgga	ggcagctgaa
8461	gatcagttag	ttgtgcatgc	ccagcctggc	ccgcaggggc	aggtaatccc	aacccaaccc
8521	tgagcctggc	cttttccctc	acagccaatg	ctgggatggg	gtctgatgag	gagttggagc
8581	agatgctgga	cagtgggcaa	agcgaggtgt	ttgtgtccaa	tgtgagtggc	cacagccagc
8641	ccctctctgc	tgtgcctccc	atccctctctg	agtcctgtcc	gtttctcgac	ctcctgggct
8701	caggtgatcc	tcctgcctca	gcctcccagag	tagctgggac	tataggtgca	agccactgca
8761	ccccgcttgc	tgtggccctt	tctgattaag	ggcaccctga	ggcctctaag	ggaatttaatt
8821	agcctgcctg	gagtcaccca	tcagattcca	ggctgagggc	tcccagaag	ctcaacagga
8881	gtttctgacc	tgtgtcggt	ctccctgtga	acagttgccc	cactcctgtc	cacccccag
8941	atcctgaagg	acacgcaggt	gactcgacag	gccttaaatg	agatctcggc	ccggcacagt
9001	gagatccagc	agcttgaacg	cagtattcgt	gagctgcacg	acatattcac	ttttctggct
9061	accgaagtgg	agatgcaggt	gggtgccccg	cgcagcccca	gacgtgagac	caggctcagt
9121	ccaaactgcc	agMctcccgc	caYccttaga	ttctctccct	gaggcttttg	tgtcttccag
9181	gtttggccat	gccccagat	tgggtgcttat	tcctatcctt	agctgtacct	cgagaatggc
9241	acctgcctct	gctgctacac	agatgcccac	tcccttctgc	atagcaccct	gccccctctc
9301	caaaacttga	gcctgcccag	gtctggcccc	agccctcact	ccccctccac	taacagcatc
9361	cacccttata	cctctcagag	gtccagtcag	agttgcccta	gaggggctgc	ctcctaacat
9421	ctgtacaagg	ctgggggtggg	ggcggcggtt	ccctggccct	ggttgtgagt	Wgagttgagc
9481	ttccagccct	gtcctggagg	agctggcctc	agtcagtcta	cagccaatgc	ccttttgcag
9541	ctgagactta	caggaaagag	atctcattca	gtaggagtac	tgagacctga	ggctgggtgg
9601	gccaggagga	ggcagggata	gggagggcct	tgcagcagct	gtagataggc	ctggaagaat
9661	gggtaaattc	agacagattt	gtgaaggcac	agttcaccat	ctgtgaaagg	tatgagccat
9721	ttgaggccct	tagctccaag	ctaccactgc	agatagaggt	tgtatgggat	aagtgagcag
9781	gggacaaggg	actacatgat	agaagggggc	tggaaagccat	ccccaggag	tctgaacttt
9841	tgtcagatca	agtcttgccc	ttgtctttgt	tagtgcaatt	tttttttccct	gccaggaatg
9901	ttcttcagtc	atctgggggtg	gggtggggcaa	aggcatcctt	acctccctga	accaccccat
9961	cctctgagca	gggggagatg	atcaatcgga	ttgagaagaa	catcctgagc	tcagcggact
10021	acgtggaacg	tgggcaggag	cacgtcaaga	cggccctgga	gaaccagaag	aaggcgagga
10081	aggtgagcct	cccaggcccc	gccactgccc	caggcaccct	gtgtgacttc	cctgaccccc
10141	tcctctccca	cagaagaaag	tcttgattgc	catctgtgtg	tccatcaccc	tcgtcctcct
10201	agcagtcatc	attggcggtca	cagtgggttg	ataatgtcgc	acattgttgg	tgagatgttg
10261	tgggctgccc	cctggcctgc	cccagccctg	gccccagccc	tccctcctcc	ctcagaccct
10321	gttctccctc	ctttcccttac	aggcactagg	agcaccagga	acccaggggc	tggccttctc
10381	tcccagcagc	ctggggggca	gggcagagcc	tccagtcgga	ccccttctc	acactggccc
10441	ctatgcagaa	gggcagacag	ttcttctggg	gttggcagct	gctcattcat	gatggcctcc
10501	tccttcaggc	ctcaatgcct	gggggaggcc	tgcactgtcc	tgattggccg	ggacacacgg
10561	ttttgtaaaa	aattaaaaaa	caaaaaaaga	gcatagaaag	ccctgtgcac	gtgtgttcct
10621	ggaagggtcg	gccccaggct	tccgggcatc	caacctcctt	acctcctgga	cgtccccagg

10681	gccaggtctg	gccctggctg	ctcaggtcaa	actgccaggg	gtgctgtgcc	cacagcaggg
10741	tgggttctgcc	tttctgcacc	cccataggaa	tgggtgggca	gggaggggta	acaccggcat
10801	ctagctcctg	gctcagtact	gtccccggga	aaggaccact	gtgagtatct	gtcttggaaa
10861	tgatgaggct	gaccaggcca	ggctgggacg	caggtgagat	gggggttttg	gtggcatcag
10921	tgggccttct	tgtggcccag	aggaagaggc	accatgaaaa	aatgcctaata	tgaggctgtc
10981	actttggatg	cagtggatag	ggatgggtctg	gtttcagcag	ggatgacatt	ggagtgggat
11041	gttaagctgg	ggaagagggt	gccagtcaga	aagcacagga	ggccggggccc	tgtgaccaac
11101	aaaagcatca	tcttttacat	aagcgttttag	gcagggtgtg	gtggctcgca	ccagtaatcc
11161	cagcactttg	ggaggcccag	gcaggaggat	ctcttgagcc	caggagcttg	agaccagcct
11221	aggcaggatg	gggcaacctc	ttctcttttag	agaataataa	ttttacaaat	tagccaggcg
11281	tgatggcaag	tgtctgtcgt	cccagctact	ccagaggctg	agggtgggagg	atcgcttgag
11341	cccaggagat	taaggctgca	gtgagccatg	gtcatcccac	tgcactccat	cctgggtgac
11401	agagcgagac	cctgtctcaa	aaataatagc	aatcatcatc	agtagcagca	gcagcagcag
11461	cagcagcata	gagagccagt	gatcctggat	cagtgcacct	ggttgctgag	ggttacctgg
11521	ctgaagcagg	tgggtggcagc	agaaaagcct	gacctctgat	ttcttccata	aggtacctga
11581	aatccaagcc	ctgactaaat	ttcttttttt	cttttttttt	gagacagagt	cttgttcttt
11641	tgcccaggct	ggagtgcagt	ggcactatct	cagctcactg	caagctccgt	ctcccagggt
11701	cacgccattc	tcctgcctca	gcctcccagag	tagctgggac	tgcaggcacc	cgccaccaca
11761	cccggtctaat	tttttgtatt	tttagtagag	acgggggtttc	accgtgttag	gatgggtctcg
11821	atctactgac	atcgtgatct	gccctcctcg	gcctcccaaa	gtgttgggat	tacaggcgtg
11881	agccaccgcc	taaatttcta	agggctccta	gtcctgatgc	ctaatttctg	gagtggacgt
11941	ggctcctggt	ccccgacacc	tagagttttt	gtttgtttgt	ttgtttgttt	tgagacagag
12001	tctcgctctg	tcgccagcc	tggggtgcag	tggcgcaatc	tcggctcact	gcaagctccg
12061	cctcccgggt	tcacgccatt	ctcctgcctc	agcctccaga	gtagctggga	ctacaggcgc
12121	ccgccaccat	gcccggctaa	tttttttttt	ttttttgaga	cggagtcttg	ctctatcgcc
12181	cagactggag	tgcagtgggtg	cgatctccgc	tcactgcaaa	cttcgcctcc	cggtttcacg
12241	ccatttctct	gcctcaggct	cctgagtagc	tgggactaca	ggcaccgcgc	accgcgcccg
12301	gctaattttt	tgtattttta	gtagagacgg	ggtttcatcg	tgttagccag	gatgggtctcg
12361	atctcctgac	ctcgtgatcc	gcccgcctca	gcttcccaaa	gtgctgggat	tacaggcatg
12421	agccaccgcg	cccggccccc	gacacctagt	tttaaagggt	aagccggctc	ctggcacctg
12481	cctacttgca	gtagggcggc	gcctagctct	gacctccaag	gtctggggac	tgcgtcgcag
12541	ccgccagtc	catcccactt	tcaatcttac	aggccccctgc	tgttgctgcc	gctgccgcgc
12601	ctcccagctg	cccagtctgg	cgggctcagt	cccgcgttgc	catgtgtggg	agaccgcgtc
12661	gcgtaagcgc	tggatgtggc	ttcgctgatg	cacattggac	cgggctctgg	actgggctag
12721	gggaagggca	ggagggcgga	attgggcccg	agggccaggc	ctcgccgacc	cccactgcg
12781	cctcccgggtg	gccccgcagc	gcctcccgggt	ggccctggag	tgcaggctct	accgtccgag
12841	atcgtccgca	actgggcgag	ctgtgcattg	ggcgtggcta	aggccgtgggt	ttgggttacga
12901	ttggccagcg	ggacttaagt	gttgtctctg	aagagcatgg	acattagtct	ggagggtcct
12961	ggaagagtga	tccccgcccc	accatcaaat	ggcgcttagg	tctaggaagc	gggtgtgggt
13021	ggggccttag	ggcgaggcgc	agacataccc	cgaagtgggt	ggattgtata	ccgcaagggg
13081	ctggatcgaa	ccccccaaag	acactggaag	gctgtgtggc	tgaggagggc	ccggcagatc
13141	cagtgtgtcs	tgggcttttac	aggaaagagc	tccaccttct	ctggagtgtg	cagatgcatg
13201	ctaggtgtgt	ccaccgatg	ggagctgcgg	gccgggcaga	tgctgccccca	gtacaaagct
13261	gatttggacc	tggggcctct	ggacttccct	gattctctgc	ttgcatctcc	agcaaagtcc
13321	tgtcccgttg	gctgccttca	tccactctct	cacttctctg	ccttcagagt	aaaattgcaa
13381	gatctgtgggt	gcttactggg	atctgataga	gtctctcggc	atccactgtc	tatgcagcgg
13441	gtgtccacct	gcagcggggg	ccatgtgcag	cggggggcca	cgtgcagtgt	gtgcctcttc
13501	ttagccatgc	tggacagcgc	cgcccctgaa	aagcagctcc	ccggtttcac	ccagaaagcc
13561	atccagaacc	tcctggaaaa	ggtggcctga	tggccaagtg	gcctcggatg	ccaggctcaa
13621	tcctttgaac	ttttcctgtg	ggctgtcagg	acccatagaa	gggtctttgag	caggtgagtt
13681	tggagcagat	ctggtaggca	agcgaacaga	tggatgYgtg	cactggagat	tccgtgggtt
13741	cccctgtgta	catctcttcc	ctttgggaaa	ctgccctgag	tgaggggcta	agggcaggat
13801	ttgcattgaa	atcctagctt	tgctgctgtc	agcccaactt	ttaggcaaca	gggtcttggt
13861	ttgatgtgac	atttccaagt	ccatcttgta	tcacaacctg	tcagctgcag	ctcacttatt
13921	caatctattg	tgggttcaagt	tcccaagaaa	atgaatcagt	ctgggtctgct	ctccagatca
13981	gattacgttt	acttgcctag	gaattgtctg	ccctttaact	caagactttg	cactgtttgt
14041	cacatttgta	atcccagcac	tttggggaggc	caaagcagga	gtattgcttg	agcccaggag
14101	ttcaagacca	gccagggaaa	tataacaaga	ccctatctct	acaaaaatta	aaattagggt
14161	gggcaactgtg	gctcatgcct	gtaatcccag	cactttggga	ggccctggca	ggtggatcac
14221	ctgatgtcag	gcgttcgaga	ccagcctgac	caacatgggtg	aaaccccgctc	tctactaaat
14281	acaaaaagtt	agctggatat	ggtgggtgcag	gcctgtaatc	ctacttggga	ggctgaggca
14341	gaagaatcac	ttgaaccccg	gaggtggagg	ttgcagtgag	ccgagattgt	cccattgcac
14401	tccaacttgg	gcaacaagag	caaaactccc	tctcaaaaaa	aaaaaaaaaa	aaaaaaaaagc
14461	cagggtRcatg	tcagtgggtac	gtgcctgtgg	tcccagctac	ttgggagggt	gaggtgggag
14521	gattgcttgg	gcctgggggtt	gagaccacag	tgagccaata	ttgcaccact	gcactccagc
14581	ctggacaaca	gaataataacc	ctgtctcaaa	aaaaaaaaaa	aaaaaaaaaga	aaaaaaaaagaa
14641	aagaaaaaga	ctttgccctt	gagtcaagac	tttacccttt	tacccttggc	taagatggat
14701	gtaggaagtg	acatggtaca	aaatgctgca	gcagagcgtg	tgtatgtgct	ggaagaggag
14761	ttgactaggg	cagtgattga	catctctgtt	ccagatattt	gcttaccttc	cctgctgggc
14821	ccctccctat	aggagcatta	tatgctcatt	ccctacttac	aatagggtttg	gctataggac
14881	ttgctttggc	cagtgggaata	tgggtaggaa	ggcaaaatat	cggccggggcg	caatggctca

14941	cacctgtaat	cccagcactt	tgggaggatg	aggcgggtgg	atcagctgag	gtcaagagtt
15001	cgagaccagt	ctggccaacg	tgggtgaaacc	ctgtctctac	taaaagtaca	aaatttagcca
15061	ggcatggttg	cacgggcctg	taatcccagc	tgctaggaag	gctgaggcag	gagaatcact
15121	tgaacccggg	aaggaggagg	ttgcaatgag	cccagatcat	gccattgcac	tccagcctgg
15181	acaaaaagtg	aaactccgtc	tcaaaaaaaaa	aaaaaaaaagg	taaagtatca	cttctgcata
15241	gaagcttttag	ggcaccattg	agtactctag	cagcttccag	tctcttctcc	ctctgctcag
15301	gctcataaac	ctggcagttt	ccagatctag	acttctcttt	cagcctgcaa	cccagaatga
15361	caatgacatg	aagctgggct	acagcctacc	tataaaatga	tgcagaattt	aagaaataaa
15421	tctctcttgc	tgtgagccat	tgatatatgg	aggttgtttg	ttagcacatc	caaagtgtta
15481	aacaaactgt	tacagaatta	ataccagaa	gtggtgtgct	gcaacaataa	aaattgagcc
15541	tcagccgggc	acggtggctc	acacctgtaa	tcccagcatt	ttgggaggcc	aaggtaagtg
15601	ggtcaccta	ggttaggagt	ttgaaaccag	cctggccaac	atgacaaaac	cctgtctcta
15661	ctaaaaatac	aaaaaaaaatt	agccaggcat	ggtggtagg	gcctgtaatc	ccagctagag
15721	gctgaggcag	gagaatcgct	tggaccaggg	aggcagaggt	tggcagtMg	tcaagattgc
15781	gccactgcac	tccagcctgg	gcgatggagt	gagactccat	ctcaaaaaat	taaaaaataa
15841	aaataaaaaat	attattaaaa	attagccagg	tgtgatggca	tgtgcctgta	gtcccagcta
15901	cttgggaggc	tgagatggga	ggatcacttg	agcccaggaa	gcagaggttg	cagtgagcca
15961	agattgcacc	actgcactcc	agcctgggtc	caaaaaaaaa	aaaatccccca	gccaggcatg
16021	gtggctcatg	cctgtaatcc	cagcactttg	ggaggctgag	gtgggtgctg	aggtcaggag
16081	tttgatacta	gcctggcaaa	catggtgaaa	ccctgtctcc	actaaaaata	caaaaattat
16141	ccaggcatgg	tgggtgggcac	ctgtaatccc	agctactcag	gaggctgagg	ctggagaatc
16201	gcttgaacct	tggatgcgga	ggttgcagtg	agccaagatc	aagccactgc	actccagcct
16261	gggcgacaga	gcaagactat	ctcaaaaaaa	aaaaaaaaaag	cctaaactat	gtaaactata
16321	tgacattgac	gttgagctgg	acagtggctg	gtaagggaac	tgtcattgga	agttggaaag
16381	atggtgacgt	gtgttatgca	atggtgaatc	gtttggttaa	actgtaagct	tatgaccaa
16441	tgagcttttag	gcttttaggta	aagaactggg	gaaaggaggt	attggtagca	tgctgtcact
16501	actattgcat	gcatttgagg	agttactaga	agaaagagat	gactcagaaa	ttaaatggtc
16561	agttttataag	cagaaatgga	agagaatata	gaaattcgag	gcaagtgatc	cacattttca
16621	gtaaaagata	caactgagaa	agtccttgag	ccacaagggt	ttcgtttttg	tttttgagac
16681	agtcttgctc	ttgtttccaa	ggccaccttc	tgggttcaag	cctttctcct	gactcagcct
16741	cccaagtagc	tgggattaca	ggcgtgcacc	accacgctca	gctaattttt	gtattttcag
16801	tagagacagg	tttcacccatg	ttggccaagc	tgggtcttgaa	cttctgacct	caaattgatcc
16861	tcccacctcR	gcctcccaaa	gtgctgggat	tacagggtgtg	agccactgcg	accggctgag
16921	ctacaagttt	tgattaaaag	tcactcttgt	ggcaagggcc	atatcaagta	tatggctatt
16981	atgccctttg	taaaaatctc	caactgatc	aaagtgggtt	ctaataaatc	ctctcagcta
17041	gtcaagatga	ttcaaaggaa	agagggttaag	agtgtaaact	accttggctg	ggcgtgggtg
17101	ctcacgcctg	taattccagc	actttgggag	gctgaggttg	gcggatcacc	tgaggtcagg
17161	agtttgagac	tagcctaacc	aacatggaga	aaccccgctc	ctactaaaaa	tacaaaatta
17221	gccaggcatg	gtggtgcatg	cctgtaatcc	caactacttg	ggaggctgag	gcaggagaat
17281	tgcttgaacc	tgggaggcgg	agggtgcagt	gagccaagat	cacccatggc	actccagcct
17341	gggcaacaag	agtgaactc	catctcaaaa	aaaaaaaaaaa	atgtagctta	cctgaggggag
17401	tcagtaggct	caactacagt	taagtctaac	gtcatggtta	tgtctgaaaa	gaattatggg
17461	tatgctggtg	acccatggat	ctgaatggag	taaaatacgt	aagttcagtt	ttggagggaa
17521	ttgccctgct	tcccctgcct	aacacccctc	caccctgaca	aaaagccacc	aggttaaatc
17581	ttgaccatga	gtgttcaata	cttagtatga	tttttaggtc	cccaagtttc	tttctttttt
17641	tttatctcgg	agaccgggtc	tcactctgtc	accagcctg	gagtgcagtg	atgcaaccac
17701	agctctctat	aacctcgaac	ttctgggctc	acacgatcct	cctgcctcag	cctcccaagt
17761	agctgggact	acaggcccat	gccacccag	caggctaatt	tttggttttc	aaattttttt
17821	gaaacaaaaat	ctcactctgc	cacccaggct	gaagtgcagt	ggcacgatct	tggctcactg
17881	caacctccgc	ttcctgggct	tgagtgatec	acttacctca	gcctcccaag	tagctgggac
17941	tacagggtgtg	cgctaccatg	cccggttaat	ttttgtattt	ttttggtaga	gacagggtct
18001	tgctatatattg	cccaggctgg	tctcgaactc	ctgaactcaa	gcgattcacc	tgtcttggcc
18061	tcccaaagtg	ctggcattat	aggcgtgcag	tgtaccacca	tgcccagcct	atttttgttt
18121	tgttttgctt	tgttttgttt	tgagatgaag	tcttgctctg	tcactccagc	tggagtgcag
18181	tggcacaaatc	aagcctcact	gcagcctcta	cctctagggc	tccagtgate	ccccacctc
18241	agccttctga	gtagctggga	ctacaggcat	gcgccaccac	acctggctaa	tttttctatt
18301	tttttctgga	gaggatttca	gcctgttgcc	caagctgggtc	ttgaacttct	ggtcttaagg
18361	agttctccct	cgttggcttc	ccaaagtgat	gggattacag	gtgtgagcca	ccatgccag
18421	cctaattttt	gtatttcagg	tttttttttg	ttttgttttg	ttttgttttt	agtagagatg
18481	ggggtctctg	tatgttgccc	aggctggcct	caagcaatcc	ttgcctcaag	tgatcctcct
18541	gcctYagcct	ctcaaaaatac	tgtgattgca	gatgtgaacc	accatgcccg	gcctgggtct
18601	ccaaattttct	tttttttttt	tagagacgga	gtctcgttct	gtcaccaggg	ctggagtgc
18661	gtggtgtgat	ctcggctcac	tgcaagctct	gcctcccagg	ttcacgccgt	tctccgcct
18721	cagcctcccg	agtagctggg	actacaggYg	cccgccacca	tgcccggtta	attttttttt
18781	gtattttttag	tagagacagg	gtttcactgt	gttcgccagg	atggtttcga	tctcctgacc
18841	tcgtgatctg	ccgcctcgg	cctcccaaag	tggtgggggt	ataggcgtga	gccaccgcac
18901	ctggccatgg	gtctccaaat	ttctatgggc	atgaaggaga	ctgagaaagc	tactctactt
18961	cagaaagaca	taaccaccag	tgtcctctca	attgtggcca	aggagaataa	gtggaaaagg
19021	gtggtttact	ctaagggcag	agccaagaac	atggtgaaga	atgaactagg	gaactcttcc
19081	cactcccagg	gaaaagtggg	ggttcttctc	aacatctgcc	caKcagcact	ttagacttag
19141	tggggcccag	agcctgctgt	gtgtctcctg	tccttccttc	cttttttttt	tttttttttt

19201	tttttgagac	agagttttcac	ttttgtcacc	catgtttgtag	tgcaatggca	ctatctcggc
19261	tcactgcaac	ctctgcctcc	tgggttcaag	cgattctctt	gcctcagcct	cccagagtagc
19321	tgggactaca	ggtgcatgcc	accacgcctg	gctaattttt	ggttttgggg	ttttttgttt
19381	ttgtttttga	gacggagtct	tgcactgtcg	cccaggctgg	agtggaatgg	cacgatctcg
19441	gctcactgca	acctctgcct	cctgggttca	agcgattctc	ctgtctcagc	ctcctgagta
19501	gctgggacta	cagggggccc	ccaccacgcc	cggctaactt	tttgtatttt	tagtagagac
19561	cgggtttcac	tatgtttggc	tggctggtct	tgaactcctg	accttgtgat	ctgccccct
19621	cggcctccca	aagtgctgga	attacagacg	tgagccactg	cgcctggcta	atttttgtat
19681	tttttagtaga	gacaggtttt	caccgtgttg	gccagggtgg	tctcaaactc	ctgacctcag
19741	gtgatccacc	ggcctcggcc	tcccaaagtg	ctgggattac	aggcatgagc	caccgcaccg
19801	ggcctgttcc	tctcttctga	acgggagtgt	gctctgctgt	tctcctgtcc	ttgttctgct
19861	ttatatgttg	gatgtgttct	tgtgtgtgtg	tgtgtagaaa	tggggcacag	gtaacttgtc
19921	tctgtctctc	tcttattttg	tagctcatag	gtctctgaat	caagagaagc	cacatctgga
19981	cctgatatag	aagagactat	tagagatcct	gggcttgagg	ctgattccat	gtcagatggg
20041	tcacttaggt	ggtctccctt	gggaagggga	tgcatttatt	ttgcataatg	aagaaaatgc
20101	aaaggcagta	tttgtaagga	agagggcaga	cgggggaaga	ttttataatt	gttcaaaaac
20161	attcactggg	atgtgtgtgg	tggctcacgc	ctataatccc	agtgcctttg	gaggggtgaag
20221	caggaggatc	acttgaggcc	aggagtttga	gaccagcatg	ggcaacatag	tgagacccta
20281	tctctacaaa	aaataaaaaca	ataaaaaaaa	attagctggg	cgtgggtggtg	cttgcctgta
20341	gtcctagcta	cttaggaggc	tgagggtggga	ggatcactta	agctcaggag	gtagaggctg
20401	cagttagtta	tgattgcacc	atgcacctat	gcactccagc	ctgggcaaca	caacaaaaca
20461	ctgactctaa	aaaaacaacc	aacaaaaaaa	aatcacatgt	attcactggc	cctctctttg
20521	gggacctgct	acatagaatg	gtttttttgtc	cccagttcac	tgacatcagg	tatggctatg
20581	tggcttgctt	tagaccatgg	actttgagtg	gaaatgacat	gtgccacttc	cacgaggaag
20641	ctttaaaagc	cgtcatgggg	tctgccacct	tctctctctt	cgggtgtctgg	agacggaaag
20701	ttccagcttg	agacttttcc	ttcagacagg	gctctRgaat	gaagatagca	tagaacagag
20761	tgggtcccatg	gaggacatgg	atatgagtga	gaaatcaaca	tgggtgtgtg	agcccctaag
20821	atttgggggc	tgctattact	gcagcgtaac	tggatcccag	ctgatagatg	cagcctccct
20881	gtgggatacc	ctgctcaggt	atcctttccc	atcaccatga	caactgacac	accataatga
20941	gctatgctga	tgttaggaag	tctccgcctt	tgctcctctt	cagagctggt	caccctcagg
21001	tcctaaccag	tgagcctatt	tctttttttt	tttctttYtt	tttttYtttY	tgagaWggag
21061	tcttgctctg	tcaccaggct	ggagtgcagt	ggtgcatctt	cggatcaatg	caacctctgc
21121	cttctggatt	taagcaaata	ttgtgcttca	gcctcctgag	taggtctgga	actcctgacc
21181	tcaggccatc	cgccagcttt	ggccttctaa	agtgcctggga	ttacaggcat	gaaccaccgt
21241	gcccagccaa	gccgagtctt	cttgattctt	gctggcattt	ggcaactagt	agcagctgct
21301	cacaggaact	gtaaaaacat	ctgggtggggc	ccagaccttc	tagcatcaac	atgggtgccta
21361	gtaaatatca	atctcacatg	catectgaga	tgcattaaaa	agaagctgtc	caggccggggc
21421	acggggggctc	acgcctgtaa	tcccagcact	ttgggaggca	gaggcggggtg	gattgcttga
21481	gcccaggagt	ttgagaccag	tctaggaaac	atggcaaaat	cctagctcta	tttttaaaaa
21541	gggggggaaa	aagaaataaa	aaagctgggc	atgggtggtc	acacctgtaa	tcccaacact
21601	ttgggtggct	gaggcaggtg	gatcacttga	gagaccagcc	tggtcaacac	catgaaaccc
21661	catctctact	aaaaatacaa	aaattagcta	cacctcatgg	tgcaacNcctg	tagtcccacc
21721	tactcgggag	gctgaggcag	gagaatcgct	tgaacctggg	aggtggagggt	tgcaagtgage
21781	ccagatcacg	ccactgcact	ctaacctggg	ctagagagtg	agactctgaa	aaaaaaaaaa
21841	aaaaaaaaaa	gagaaaagaa	cataatgttt	ggccaggcat	ggtgccttac	acctgtaatc
21901	ccagcagttt	gggaagccga	ggggggcggat	cacctgagggt	tagttcaaga	ccaacctaat
21961	caacatgggtg	aaacccatat	ctactaaaaa	aaaaaaaaaa	attagccagg	cgtgggtggtg
22021	gatgcctgaa	atcccagcta	cttgggaggc	tgaggcagaa	gaattgtttg	aaccttgagg
22081	gcagaggttg	cagtgaaccg	agattgtgtc	actgcactcc	agcctggggc	acaagagtaa
22141	aactccgtct	caaaaaacaaa	acaaaaacaaa	aaagaatcat	aatgggttagt	aagtgaaaat
22201	tctgaattag	tttgtgtatg	tgtattgttg	catataatag	agacccaaat	taactgtggc
22261	ttaaataaga	tagaagttta	tttctctctt	ctataaaaagt	ccaagttagt	atgatggatc
22321	tttccatgaa	atcattagga	gccagatttt	ttgtatcatt	cattcattca	ttgattcatt
22381	actaccatta	atagagacaa	ttttctgcac	cattcaggct	ggagtgcagt	ggtgcaatca
22441	taattcactg	taacctcaaa	atcctgggct	ccagcgattc	tctgcctta	gccccacaa
22501	agtagcaggg	actacaagca	catgccacca	cgcctggcta	atttttcttt	ttcttttttg
22561	tagaggtggg	gtgttactat	gttgcccagg	ctgggtctcaa	actcctggcc	tcaagtgate
22621	ctcctgcttc	acctcccaa	agctctggga	tgacaggcat	gagccactct	gcccctccag
22681	gtcttttttta	tcttggttgc	gttccatccc	tagggcggtg	ccctcaccca	catgatccaa
22741	tatgattcac	caccacttcc	acagtctggc	ccttctgagg	ggtgatgggt	tgccctttgc
22801	cctaaagagc	atgattcaga	agtacagatc	atttttgctc	taatcccat	agccaggatg
22861	tagtcatatg	gctacatccc	gatgaaagtg	ttgctgagaa	atagaatctc	tacctgagc
22921	agcttttttg	ccagataaaa	gttcagttac	tctgggagaa	gggtagaatg	gatactgggg
22981	gaccataagc	tggtgccacc	acacacattg	aatgttaacc	catcccaact	gtatcaattt
23041	ttccttcctt	tcttcccttc	ctccctccct	ccctccctcc	ctccctcctt	ccttccctcc
23101	ttccttcatt	ccttcccttc	tttgttcctt	tctttcgaca	gtctccctct	atcccttagg
23161	ctggagtgcR	gtgttgccat	ctcggtcac	tgcaacctct	gcctcccagg	ttcaagcaat
23221	tctcctgcct	cagcctcctg	agtagctggg	attacaggcg	tgctccacca	tgcccagcta
23281	atttttgtat	tttttagtaga	gacaggattt	ccccatgttg	gccaggctgg	tcttgaactc
23341	ctgccctcag	gtgatccacc	cacctcagcc	tccaaaagtg	ctgggattat	aggcgtgagc
23401	cactgccttg	gcctcaaacc	gtatcaattt	tctgttactg	atttaaccaa	ttatcataca

23461	ctcagtggtt	taaaaccaca	cacatttact	ttcttacagt	tctggaagtc	agaagttcaa
23521	aatcagtttc	attgagccaa	tgtctggtgt	cagcagggct	ggtttttgtt	ggtggctctg
23581	gtggacaatg	tttccttgcc	ttcttcagct	cttttttttt	tttttttttt	tgagacaggg
23641	tctcgctctg	ttaccagggc	tggggtgcag	tgggtgcaatc	atagctcact	gcagcctcca
23701	tctcccaggc	tcaggcgatc	ctcccgtgtt	agccttctca	gtagctggga	ccacaggctc
23761	acgccaccac	gccctgctaa	ttttgtttat	tttttgtaga	gatgaggtct	cactccattg
23821	cccagactgg	tctcaaagtc	ctggattcag	gagatcctcc	tgcctcagcc	tcccaaaggt
23881	ctgggattac	aggtgtgagc	cgttgacccc	cacctctttt	cagtttagaa	aggctacctg
23941	tattccttgg	ctgggtgggtc	catcctccat	tggaaagcac	atgaatccat	ctctgccttc
24001	atcatcactc	cacttttctc	tctgagactt	attcctcctg	tgtgcctctt	aggaggatgt
24061	tcatgattac	ataccgccct	cttgataaat	cctgaataat	ctctccatct	caggatcctt
24121	cacattttca	aaatcccttt	caccatataa	cgtgacattc	acagattcca	ggaataggac
24181	gtagacatat	ttaggggggt	tctctattca	gcctactgta	ccatgccatt	ccacacttaa
24241	ctccttcact	catttattca	taaaatatgt	attgagcaag	acctgtgtgc	caggcattgt
24301	gttaggtgct	agagaaatag	aggtgaaaat	acagacaagg	cctctgcttt	catggagttt
24361	atattctagt	gaagaggaca	agtaaatagc	taagctattc	tttttttttt	tttttttttt
24421	tttgagacgg	agtctccctc	tgtcgcccag	gctggagtg	agtggcgcaa	tctcggttca
24481	ctgcaagccc	cacctcctgg	gttcacgcca	ttctcctgcc	tcagcctcct	gagtagctgg
24541	gactacaggg	gcccgcacc	acgccagct	aattttttgt	attttttagta	gagacggggg
24601	ttcacctgtg	tagccaggat	ggtctcgatc	tcctgacctc	atgatccacc	cgcctcggcc
24661	tcccaaagtg	ctgggattat	aggcgtgagc	caccatgccc	ggccaagagc	taagctattc
24721	taagctataa	cgtgtattat	caaaacaatt	aaggccaggg	acagttgctc	acacctgtaa
24781	tcacaacact	ttgggaggct	gaggcgggtg	gatcatttga	ggtcaggagt	ttgagaccag
24841	cctggccaac	atggtaaaac	cctgtctcta	ctaaaaatac	aaaaaaatta	tccagggtgtg
24901	gtgggtgcatg	cctgcagtc	cggctactcg	ggaggctgag	gcacaagaat	aagaattgct
24961	tgagtgggga	ggtggaggtt	gcagtgagcc	aagatcatgc	cactgcacta	caggctagga
25021	gacagagWga	gaccctgtct	taaaaaaaaa	gcaattaggg	caagtgcagt	ggctcatgcc
25081	tgtaatccca	gcactttggg	aggccaagga	gggcagatca	cgaggtcaag	aaatcgagac
25141	cagcctggcc	aacatggtga	aaccctgtct	ctactaaaaa	tacgaaaatt	agctgggtgt
25201	ggtggcgctg	gcctgtagtc	ccagctactc	gggaggctga	ggcaggagaa	tgccttgaac
25261	ccgggaggtg	gaggttgcag	tgagccgaga	tcacgccact	gcactccagc	ctgacgacag
25321	agtgggaatc	catctaaaaa	aagaaagaaa	gaaattggct	ggagaatcgc	ttggaccag
25381	gggtggaggt	tgccatgagc	tgagattgtg	ccactgcact	ccagcctagg	caacaagagc
25441	aaaactccgt	ctcaaaaaaa	aaaaaaaaaa	tcccagcact	ttgggaggcc	aaggagggca
25501	gatcacgagg	tcaagaaatc	gagaccagcc	tggccaacat	ggtgaaacct	tgtctctact
25561	aaaaatacaa	aaaattagct	gggtgtgggtg	gcgggtgcct	gtagtcccag	ctacttggga
25621	ggctgaggca	ggagaatggc	atgaacctgg	gaggcggagc	ttgcagtgag	ccgagatcac
25681	accactgcac	tccagcctgg	gcaacagagc	aagactctgt	ctcaaaaaaa	aaaaaaaaaa
25741	gaaaagaaaa	gaaattaaac	agtgtgatgt	gacaaaaagt	gatagggggg	tggagacagc
25801	ttttctgttg	gatggttagg	aatggcttct	tagaaaagat	gactgacaca	tgggaggctg
25861	atgtggcaga	tcacgaggtc	aggagatcaa	gaccatcctg	gctaacacgg	tgaaaccccg
25921	tctctactaa	aaaatagaaa	aaattagccg	ggtgtgggtg	cgggcgcctg	cagtcccagc
25981	tactaaggag	gctgaggcag	gagaatggcg	tgaacccggg	aggcagagct	tgacgtgagc
26041	tgagatcacg	ccactgcact	ccagcctgga	cgacagagcg	agactccatc	tcaaaaaaaa
26101	aaaaagaaag	aaaagatggc	tgacacagag	ggcagagctg	agagccaaga	gggcagaaaa
26161	gagccataga	aaaccatttc	caggcctgga	agcctaaagg	aatttcccag	ctggatttgc
26221	agttgctttg	gattggtgac	tcctttttac	ctttcattgt	taggggacct	gcaggttcct
26281	ttgcctgctg	tgcagctaca	gctccattac	accaagacaa	tagggatgca	gcagagagag
26341	ttactggtgc	agggcaccta	gtgcagagat	gggaagaggc	cctcaaactc	atctccccga
26401	gcaattctgg	gagaggggtt	ctaagggggac	tgtggagggg	aggggattgt	ggaggggtaag
26461	gttttgggca	actgggtcat	tgattgattg	ggggaaggat	gtagaagctg	cgtttttggg
26521	ggaattagct	ccttgtgggg	tccttcagg	cagctgagtc	agtagttcca	tgaggacctg
26581	aaggaatctc	ttttcttttc	ttcttcttct	tccttttttt	tttttttttt	gagatggagt
26641	ctctctctgt	cgccaggcta	gagggtgcagg	gggtcgcagg	ctagagggtgc	agtggcatga
26701	tcttggtca	ctgcaacctc	cacctcccgg	gttcaagcaa	ttctcctgcc	tcagcctccc
26761	aagtagctgg	gactagagg	gcgtgccacc	acaccagct	aattttttgt	tttttagtag
26821	agacagggtt	tcaccatgtt	ggccagggtg	gtctcgatct	cctgacttcg	tgatcggccc
26881	ccgccccacc	ctcggcctcc	caaagtgtct	ggatcacagg	agtgagccac	ggtgcccagc
26941	cttaattttt	gtatttttcag	tggagacggg	gtttcaccat	gttgatcagg	ctggagtgc
27001	atggtgcaat	cttggtcac	tgcaacattc	gcctcctgga	tttgaatgat	tctcctgcct
27061	cagcctccca	agtaactggg	attacaggaa	tgcgtcacca	cgcccggcta	attttgtatt
27121	tttttagtag	agacgggggt	tcaccatgtt	ggtcaggctg	tcttgaactt	ctgacctcaa
27181	gtgatccacc	tgccttggcc	tcccagagtc	tgaaggaata	tctcaaagg	aacacttaat
27241	gttgtgtaat	gtccagggtg	tgatccatag	agcagttaaa	ggtaaaggta	actataattt
27301	tttttttttt	tttttagaca	gagtctccct	ctctgtcacc	caggctggag	tgacgtttca
27361	cgatctcggc	gcactgcaac	ctccgcctcc	ctgggtcaac	caattctcct	gcctcagcct
27421	ctcaagtgtg	tgcctgccatg	ccaggccta	tttttttttt	agacggagtc	ttgctctgtc
27481	acccaggctg	gagtgcaagt	gcacaatctc	ggctcactgc	aacctccggc	tcctgggctc
27541	aaacaatgtg	ttttttcccc	tagtactttg	gtgtttgatt	atcttttttt	tttttttttt
27601	tttttttttt	agatagagtc	tcgctctgtc	acccaggctg	gagtgcaagt	gtgcaatctt
27661	agctcactgc	aagctctgcc	tcctgggttc	atcccatctc	cctgcctcag	cctcccaagt


```

27721 agctgggact acaggcacc accaccacgc ccggctaatt ttttgtattt ttagtagaga
27781 cggggtttca ccatgttagc caggatggtc tcgatctcct gacctcatga tctgcccgcc
27841 tcagcctccc aaagtgctgg gattacaggc Rtgagccact gcaccagcc tgggtgttga
27901 ttatctatta tgtcaaacag gctgggttta gtggctcacg cctgtaatcc cagcactttg
27961 ggagactgag gtgggaggat cacttgagcc caggagctga agaccagcgt agcaatgtag
28021 caactccctg cctctacaaa aagttaaaaa atttagctgg gtgcaccagY agaccagctc
28081 ctgaggaggc tgaggaggga ggatcactcg agcccaggag ttcaaggctg cagttagctg
28141 tgatcatgcc actgtactcc agcccaggca atggagcgag accctgtctc aaaataaata
28201 aaacatgaag aatgtcgaac acattatctg gtttttgttt ttgttttctt tttttgagat
28261 gttgtctcgc tctgtcacc tggctggagt gtagtgggtg gatctcggct cactgcaacc
28321 tctgcctccc gggttcaagc gattctcccg cctcagcctc ccgagtagct gggactacag
28381 gtacgtgcca ccatgcctgg ctaatttttt ttattttttt tttttcagta gggacagggt
28441 ttccgcatgt tggccaggct gttctgaaac tcctgacctc agatgatcca cccacctcgg
28501 cctcccaaag tgctgggatt acagggtgtg gccatcgtgc ccggcctgtt ttaaaaaacc
28561 atattggccc aactcggtag ctcatgcctg taatcccagc actttgggaa gccaaagcag
28621 gaggattggg tgagcttagg agtttgagac cattctgggc aacatgggtg aacctgtctc
28681 ctgcacaaaa atagaaaaat ttgccacctg tgctgggtgt tgcctgtagt ccagctactc
28741 ctcaaggctg agggaggagg attgcttgta gagcctggga agtcggagct gcagttagcc
28801 atgatcacac caccacactc tagcctgaca gaatgagacc ttatcccaa agaaaaata
28861 aatgatattg tattatatgt gaactttgaa ttatatgtg ttgtatctga agtttgaatt
28921 ttcacgttat gtttaaaaa cttggctggg cgtgggtggg cagcctgtga atcccagcac
28981 tttcggaggc caaggcgggt ggatcacctg aggtcaggag ttcgagacaa gcctggccaa
29041 catggtgaaa ccccgctctc actaaaaata caaaacttag ccgggcatag tgacatgcac
29101 ctgtagttcc agctactcgg gaggtgagg caggagaatc gcttgaaccc aggaggcaga
29161 ggttgtagtg agctgagatc gtggcattgt actccagctc gggcaacaag agtgaaactc
29221 catctaaaaa ataaaaaaga aaaagaaaaa ataatacaag aaattagccg ggcgtggtga
29281 caggcacttg tagtccctcc cagctactca ggaggctgac gcaagagaat tgcttgaact
29341 tgggagggtg aggttgtagt gagctgagat cgtgccattg cactctagcc tgggaaacaa
29401 gagcaaaact cagtctcaaa aataaatagc ttgaaccogg gaggcagagg ttgcagttag
29461 ctgagattgc accacttcat tccagcctgg gtgatagagc aagactctat ctctaaataa
29521 ataaataaat aatcctttag gatggcaatg aatttaagga ctaaactagg gagaatcgac
29581 tttttttttt aaaatggagt cttggtctgt cgcccagact aggggtgcagt gggcgccatc
29641 tcggctcact gcaacctcca ccttccagg tcaagggatt cttgtccctc agcctcccaa
29701 gtagctggga ttacaggcac ccgccaccat gcctggctaa tttttgtatt ttagtagag
29761 atgggggttc accatgttgg ctatgggttg ccaggctggg cttgaactcc tgacctgagg
29821 tgatctgcct gcctcggcct cccaaagtgc tgggattaca ggcattgagc actgtacca
29881 gccatttoga cattatttat ttatttattt atttatttat tttttgaggt ggagtctcac
29941 tctgtcgcct aggttgtagt gcagtggcac aatctcggct cactgaaacc tccgcctccc
30001 gggttcaagc cgattctcct gcctcagtct cccgagtagc tgagattaga ggcaaccacc
30061 actatacccg actaattttt gtatttttca gtagagatag ggcttcacca tgttggccag
30121 gctggtctcg aactcctgac gtcagttagt cctcccacct cagcctccca aaatgctgga
30181 attaaagctg taagccagcg ggcctgggtg acatctttta ataactagtc tttccattca
30241 ggtatatggt atatgtctcc atttacttag gtcttatttc atatccttca ggttgtagct
30301 atcatttctt ttcatacagg ttttgcacat ttcttgtgag gtttattcct tcatggtcca
30361 tggattttgt tgtgaattgg gaatcctttt tccaccaagt atattttcta atttgttact
30421 ttagtataca ggaaagataa ctaattttta tctgcagttt attatctatg aaaggataaa
30481 agtagaacta ctgagtaaaa ggtttccata atcaaataag tatgggctaa acaaagctaa
30541 acagatgtgt tcaactgctg acttatcaat gcttgtgata attttttttt ttttttttga
30601 ggcagagttt tgctctgtag cccaggctgg agtgtagtgg cgggatcttg gctcactgca
30661 acctccacct cccgggttca agtgattctc ctgcctcagc ctcccagata gctgggacta
30721 tggcatgcac caccacatct ggctaatttt tgtaatttta atagagacag ggtttcacca
30781 tgttgactag gctggtctca gaactggtga cctcagggtg tctgcctgcc tcagcctccc
30841 aaagtgctgg gattacagg gtgagccacc accaccaggc aattgaagac gtatatctta
30901 tgaagaaatg ggtagatttt aatgaacaat accccttttg tgggcagatt cctaagtccc
30961 aggcctcac aacaaagggg cagtgggcct ggagatgcca gcttcagctg ccagagggac
31021 tgctcctcca gggccacccc agcccacttt tgatcaccaa gttttgatca ccaagaatcc
31081 caagaagggc acaggggaatt tcctttctta cctgcccatt aaaccttttg tcaactagaca
31141 tcctgaaaca tactttggga aactgcatcc aaagaccctt ctagtttcaa atctgtggat
31201 ccagggggtc cactgaacc ttacctgatg cccaaactcc caccattca ctcccaacca
31261 gaacacagaa gatgacctgg tgccaaaatg aaagctttta tgagtgttac tctagacag
31321 tcacgtctca gcttctgcca gcctccactg tcccagctct cttagctggc cgacagggga
31381 gctagttgct gaggggtagg gatctggagt cttaaagagca gagccaggca aaaggaggta
31441 caggaagccc ccgatggggg ctgggctccc ggagtgtggg gctggggggg catgggcttc
31501 aggcgggccc ctcttcaggc attcctagca aagccaccag gggctccagg ggtgtggggg
31561 tccccatggg cacagggtgg gtgcgttcat gcttgcgcaa gtcgctggca ctcaagaagg
31621 ccttgggaca atgggggag gtgtaggggc gcactgagct gtgagtgcgg ctgtgtttgc
31681 gcagcccagc ccggtcagag aagctcttgc cgcactRggt gcaggggaag ggccggagct
31741 ccgggtgtga gcgctcgtgc cgacgcagca gcgtcattgt ggagaaggte tccttgcact
31801 ctcggcacac aaactggggg ggcttctcgt cagcctcctc acccccgcgc tcgctgccc
31861 ctccaaggg accaggagcc tcccggacac cagcatcttg gcattccaca tgctccaccg
31921 tcatgccac cacctgccac tgtgtggcca tcacaccacc tgactccggg ggcagcccta

```



```

31981 gcagccctgc tggaggggtcc cccagccccc cccctgctRc cggggcgggt gaactctcac
32041 ctgccacgcc cacaggcagc gccaaaccca ccaccagctc ctgtgcaggg ggcacacccg
32101 cggcctcact gcttcgatgg gtccgctcgt gcttcctcag gctcgacgac accacaaagg
32161 atttcccaca tgcgttacag tgggaagggg gctccccga gtgcacccgg ctatgcttcg
32221 tgaggctggc acgctcggcg aaggctcgcc cgcactcctc acagcggag ggccgctggc
32281 cagagtgcac cagcgcgtgc cgcttgaggt cccaggaYgc cacgaacgtc ttgtcacatt
32341 gcaggcactt gaacggccgg tcgcctgtgt gcacacgccg gtgcatggcc aggtccgccc
32401 gctgccggaa gtccttgccg cacttctcgc agtggtatgg cttcacccct tcatgggcgc
32461 gctggtggcg acggaagctc gaggggtcgg agaacatgcg gccgcagcgc gggcacagga
32521 agggcttctc ccccgagtgc gtgcgctcgt ggctctggta ggaactgagc tgcgtgaagc
32581 ccttgccgca ggccggggcag cggtagggct tctgtgcgc gtggatgcgc tgggtggcacg
32641 tgagcgagga tgagcgggag aagctcttcc cgcactcggg gcagaggaag gggcgctcgc
32701 cgggtgtggg cctgcggggg tgtggaggac ttggcatgaa ggcgacagac ccataacgtg
32761 accccactgc ctgtctgggc tgtactttag gggctcccca aacgttcgtg ggggcctagg
32821 cttaatcccc taagagccac atggctgcac cccagaggaa gaagccttca ggctggctgg
32881 gtgtctctat tccaaagacc tgtctctgca cattaaagac caagatatgg gccgggcgcg
32941 gtggctcacg cctgtaattc cagcactttg ggaggccgag gtcaggagat cgagaccatc
33001 ccggctaaca cggtgaaacc ccgtctctac taaaactata aaaaattagc caggcgtggt
33061 ggtgggtgca tgtagtcccR gctactcggg aggtgaggc Rggagaatgg cgtgaacccg
33121 ggaggcggag cttgcagtga gccgagatct tgccactgca ctccagcctg ggcggcagag
33181 cgagactccg tctcaaaaaa aaaaaaaaaa aaagaaaaag aaaaaaaaaa aagaccaaga
33241 catggccagg cgcggtggct cagcctgta atccagcac tttgggaggc cgaggcgggc
33301 ggatcacctg aggtcaggag ttcaagacca gtgtgaccaa aacggagaaa ccccgctctc
33361 actaaaaata caaaattagc cgggcatggt ggcgcagtgc tgtaatccca gctactcgga
33421 aggtgaggc aggagaatcg cttgaacccg ggaggcggag gttgcggtga gccgagatcg
33481 cgccattgca ctctagcctg ggcaacaaga tcaaaactcc gtctcaaaaa acaaacaaac
33541 aaaaacaaaa caaaacaaaa cagaaaacca agatacgtgt cctccgctt ttttttctg
33601 ttccccaggc tggaatgcag tggcctgacc atagctcact gcagcctcga cctcccaggc
33661 tcaggccatc ctcccacctt atcctcccaa gtacccggga ctagaagtgt acatccccac
33721 gctcgggtaa tttttttatt tttatagaga cgaggcttgc tgtgttgccc aggctggctt
33781 tgaactcttg ggctcaagca atcctcctgc ctacgcctcc caaagtgtg gaattatagg
33841 cgtgagctat tgtgcccagc ctagaacat gtcattaatg tagaggctga gaaaaagaaa
33901 aaaaaaatg acctagacaa accaggcccc actcacacct cctgggtctcc aaaaaagacc
33961 ctcagaactg cccaactcca aaccccgccc cttttccagc tggcctacaa cggaggccaa
34021 tctgaccaa tcccattctc agagatcaac ctcaagggtg ttgccacctc tgccaatca
34081 ggggcaccaa tttctccac atgcctagcc cctccccttg gatctgcat gccaccttc
34141 ccattggctc actttaccct gagactcaaa cccaggcccc attggctgca gcaacgctgt
34201 cgccctgccc cggaaggcgc cctgccccgg aaggcRccct caccgctcat ggttgcgag
34261 gtccttgagc tccgcatagg ctttRccgca acgctcacag ctgtaggggc gcaggccagc
34321 gtgagtacgc cgggtgcttg ggaacactga agggtcagca aagctcttgc cgcagtcggc
34381 gcaggcgtaa ggccgctcgc ctgtgtggcc acgctgggtg atcttgagct tggagagcgc
34441 gccataggcc ttcgggcagt gcgcacagcg gaagggcagt tcgccagcgt gcgaggccag
34501 gtgcacgcgc aggcacacgg gctgcatgaa gcggcggccg cactcggggc acggaaaggg
34561 cttctcccc gtgtggctgc gccgtggct ggcagctcg ggtgccgtct tgtaggcctt
34621 ggggcatagc ggacacgcat agggcctagg cttggccgcg gagcctgaca ccttctcccc
34681 actggcttec tctgccttag cttctgtctc tggctttggc ttcacctcg ccacctcttc
34741 agagcagtct gccggcccat gtgtggcagc gtggcgcgct gccctgggcg cgtttgaaa
34801 tgtcttggtg caggacaSgc acttgtagcg gcggcccag cgcttgtagc cgggggctgg
34861 ggaccgggccc tctgcagcct ccacttccat ggccttgggt aacgggggtt ctctgcaaga
34921 gaagcaaagt tagaccaag ccacatacct tcgccactcc tgaaagcctc agagagaacc
34981 ctatctcatc tgcatttctc acctcggaac ccacacatcc ttcctgcccc gcatcctgg
35041 ctctgacatc ctgcgttcgt ttcctccctg atctgctcat tgaagaaagg agttggacca
35101 agtgtccgca gagccactaa gaaaggaggc tgagggtcac aaaagattca cctacacgtc
35161 ccccccSc cccaacgggc ttttccaaac actgtggcat tcccagaggc ccaggttcca
35221 tctgtctcac catcttcctt cttcagctca gtgtccaaga actatgccag gataaagagt
35281 gtaccagac gtgggcctgg cctgaaggct tccaagcgcc cagaaaagac agacctggga
35341 ccagaaaagg gctgagccaa tgggctaaat ctggtagctg gcaactgtct gaagtacag
35401 gtccccagca tttgtgtttt ctttctcct ctggatgggt agtcctcaga gacagcaact
35461 gttcacacag aattctggcc ttgcacagct gtacgggcct ccgccccaga ctggaatctg
35521 tccactctct gctctggaat cttgttggcc tgttccaca actctggtaa tggagaatca
35581 ctcaaggcag cctgagccat tgctagcagc tggaaagcct tttctgagtc ataactgatg
35641 tatctgatct aacatggcct cctgggatac cagctctagc tgagatccct actttctggt
35701 ccagaacca gacgccctcc acccagctgc tcctggggat catgggttggg aggaaacagg
35761 attaatggct gtattagtct taacaccagc tcactcctcc tgggggatga agggagagg
35821 attatggcag atccacttaa ggagtgtcga gcagctgctg ctgggggaag ggtctgagg
35881 agtgggggct gcaggagacc aggtgtgccc agaggctagg gggcctacgt tctacttgca
35941 gccctgtgga ttactatgag acctcagtga aatgagtgtt gtttataaga ctatttccgc
36001 ccggctgggc gtggtggctc acgcctgtaa tcccagcact ttgggaggcc gaggggggcg
36061 gatcacgagg tcaggagacc gagaccatcc tggctaacac agtgaaaccc cgtctctact
36121 gaaaatacaa aaaaattagc cgggcgtggt ggcgggcgc tgtagtccca gctactcggg
36181 aggtgaggc aggagaatgg tgtgaacctg ggaggcggag cttgcagtga gccaatatcg

```

```

36241  tgccaccgca ctccagcctg ggcgacagag caagactccg tctcaaaaaa aaaaaaataa
36301  aaagactatt tcctcatctg gacacgtagg ggggttggtg cttctaagtt atgacactgg
36361  gggttcaggag gaggaactg agctgagcca cgaggggtgct aggggaaata cagagactca
36421  gggcccctta tgccaggaaa gggcgggaga agcagcttac ctgggttgacc cagggaggac
36481  acaggagccc ctgacgcgtg gcaagggcca catccttaaa gtcagcacc cttctgcctga
36541  aatcccggcc tcaggcctgc acgctgcctt ccctcccaa ccccatgcag ccggtcttct
36601  cccaaaagta atgaatgatg tttcctgttc cctgctcaag aactttccat ggcttcacc
36661  acaccatgca aatcccaggg tccttcctgc ttgttccaaa tctgacaagt ccttcactgg
36721  agccccactt ccaccaggag gatcctcaag catctccctt ttgggttttg ccccaatccc
36781  acaaaactcc atcttattct cacttggtta tttcactttt cccactaaat cctagggctt
36841  agccaggtgt ggtggcatgc gccttaagtc ccagctacgt gggaggctga ggcgggagga
36901  tcctgtgaac ccaggggttc gaggtgcag ggaactatga tctgaccact gcgctccagc
36961  ctgggcaacc tggtgagacc ccatctctac taaaaataaa aattagcaga tgtggtggca
37021  tgtgcctgta gtactgccta cttgagaggc tgggggtggga ggactgcttg agcccaggag
37081  ttcaaggctg taccactgca ctccagcctg ggagacaggg caagacactg tctcaatcaa
37141  tcaatcaatc aataatcaat cctggggctt gaagataagt taaagggact gaattctaac
37201  ctttctgatg acttgaattc ttcctacagt ttccaaggga tccctcccta tttctggatg
37261  aggtactcac tacctcttcc agacggtttc tggagagtct gcctgataat gttcctcctt
37321  aataaaaatg atagcttggg ccaggttcag tggctcacac tagcactttg ggagaccaag
37381  gcgggtggat cgcttgagcc caggagtcca agacaaggcg ggtggatccc ttgagcccag
37441  gagttcaaga ccagcctggg cgatatagca aaatcccat tctacaaaaa atacaaaaat
37501  tagccaggca tgggtggagca tgctgtact cccagctact ccagaaggct gaggtaggag
37561  aaatgcttga gcctaaggag actgaggttg cagtaagcca agatgggtgc actgcactcc
37621  agcctggcaa cagagtgaga cccatctca aaaataaata aataaataaa tgataaaaaa
37681  gatagttcac atttactgag cactcgccaa ataccaggca gtatcctaaa ctcttatgt
37741  gtattagctc agttaccctt catggcaacc ccatgaggaa agttctatta ttccattttc
37801  acagataagg gaaccaaggc ccagagaaat ggttcagtat tttgttaagt gccagtccc
37861  tgaagccaaa ctgtctggct tcagattttg cctccatcac ttcccagctg atgtgaccgt
37921  gtgtaatgta ctgcatgtct tagaacotca gttttcta atctgaaaaat gagataatga
37981  Yagtacttac ctgacagagt tgggtgagga atgaatgagt caaaaataat tactgtctc
38041  aattatcaaa gogtcttctt agagccagac acattgctgg gtgtgctggg ttatttaatt
38101  taatgtctta taScttYctg agatagggat tcttgctcctt actttacaga ggaataaatc
38161  gaggttccaa gagttaagtg acttgcccat ggtccacaa tgggtaacct aagcagctgg
38221  gacttcagtc cagggtgtttt atttgcttta agttgctggg gtcttgctca gtggtctggg
38281  gcctcttaag cttgtctgct gcctccgcca gcccacagt gaccagaacc ctgagctcag
38341  gtcataacctg tgtcttctct catccttgca gaactgccct gagaccctgg ccggcacctt
38401  ttatgtctct gcttccctct cagagggctt gaccagtggt ttctgagctc tggcccttct
38461  actgcctctt gccagctctg Kgtctcagcc ttctatctg tgagttagac accaggtagc
38521  tggaggggaa atccctcctc ccatggcact tcccagggga aaaggtaggg gaggtaggtc
38581  ttggtctcag catgcgcca gctacacaaa gaggScaggt aggttaggtc tctgtctaac
38641  atcccaccat taaaaaaaaa aaaaaaaaaa atatataat atatataat atatataat
38701  tttgagatgg agtcttactc tgttgccag gctggagtgc agtgccaccac acctggctag
38761  ctgcaacctc cgcctcctga gtagctggga ctacaggcac ctgcccaccac acctggctag
38821  ttttttgtat ttttagtaga gacgggggtt cactgtgtta gccaggatgg tctcaatctc
38881  ctgacctcgt gatccgaccg cctcggcctc ccaaagtgtt gggattacag gcgagagcca
38941  ccaMgcccag actttttttt ttttttttat taaagagctt gaggtaggcc tcaggaatct
39001  gtatttttaa tacactctgg atcattccag ccaatacttt tgtttgtttg gttttgaaac
39061  aagatctcac tctgtcgtc aggttgaggt gcagtgggtg agtcatggct tactgcagcc
39121  ttgacttccc agactcaagc aatcctcca cttcagctc ccaagtagct gggactacag
39181  gcatgcacca tcatgcctgg ctaattttta ttttattttt agtagagatg aagtcttgct
39241  atgttgcttg ggtggtctga gaactcctgg gctcaagtga tctcccMcc gcagcctccc
39301  aaagtgtctg gattacaggc gtgagccacc gtgcctgccc aaccaatact taagaaccaa
39361  acacacatcc ttaggtctcc acgagctctc aggagaggag cattttaagt gttcactaca
39421  cctctttttc agatattgag attaagggtc ccacaaagga aaaactgtac acaaggacac
39481  acagctggtc aaggagccag actcgaacct aagtctccat tctctcccc aggttgaatc
39541  atgagacttc ccactgctcc caggaaaaag accaatatct tttccatggc cagcatagcc
39601  ccaaaccatc taaatcctgc ctacctgggc agatcacttg aggcaggag tttgagacca
39661  gcctggccaa catggtgaaa cccatctctt actaaaaata cacacacaca cacacacaca
39721  cacacacaca cacacacctg cctacctcac ctcccactcc tctcctggc ccactgggct
39781  ctaccacag aggcctcctt tcttctctc aaagagctaa attccttccc acctcagggc
39841  agtggcacta gcagtccct ctgtctgagc cactcttctc ccacgatctt tgtgtagctg
39901  tcttttttgg tgttattttg atctcagctc ccagtcacct cctcaaaaag agctttcttg
39961  accaccttcc cttttcttcc ccccttttaa tattccaaat ttttctctt ttttaaccaac
40021  caaggagcac tgaatgacta cctttctcaa tgctatcttt acccctgata atcattctct
40081  atctactctt tattattatt attatttttt gacggaatct catgattatc tatcaagcag
40141  ttctcctgcc tcagcctcct aagtagctgg gactacaggt gcccgccacc acgcccggct
40201  attttttttt tttttttttt tttgagacgg agtctcactc cgtcaccacag gctggagtgc
40261  agtggcacia tcctggctca ctgcaagctc cgcctcccgg gttcatgcca ttctcctgcc
40321  ttagcctcct gagtagctgg gactacaggt gcccgccacc acgcccggct aattttttgt
40381  atttttagta gagacagggc ctcactgtgt tagccaggat ggtctcaatc tctgacctc
40441  gtgatccacc tgcctcggcc tcccagagtg ctgggattac aggcgtgagc cactgcaccc

```


40501 ggcccaatcc cggctaattt ttgtattttt agtagagatg gggtttcacc atgttggcca
 40561 ggatggtctc gatctattga cctcgtgatc cgcccgcctc ggcctcccag agtgctggga
 40621 ttacaggtgt gagccaccgc gcccgccctc ttttttgaga cggagtctta ctctgtcccc
 40681 caggctggag tgcaatggca caatatctgc tcaactgcaac ctccgcctcc cgggttcaag
 40741 cggttctcct gcctcagctt cccgagtagc tgggaattata ggcgcccgcg actacatctg
 40801 gctcattttt gtatttttag tagagagagg atttcacccat gttggccagg ctggtcttga
 40861 actcctgacc tcaagtgatc caccacacct ggcttcccaa agtgcttgga ttacaggcat
 40921 gagccaccgc acccagccct ctttactttt taaaaaatgt ttttattttt atttatatat
 40981 ttatttttga gacagagttt cactcttggt gccaaaggctg gagtgcaatg gcaccatctc
 41041 tgctcactcc aacctccgcc tccccgggtc acgagatttt cctgcctcag cctcccgagt
 41101 agctggaatt acaggcatcc accaccacgc ctggttaatt ttttgtattt ttagtagaga
 41161 tggagtttca ccatgttggc caggctggtc tcgaactcct gacctcagat gatccactgc
 41221 ctccggttcc cagagtgtcg ggattacagg catgagccac cgtgcctggc ttatttttat
 41281 ttatttttatt atttattggt attattattt gagacagagt ctccctctgt tgcccaggct
 41341 ggagtgcaat ggtgtgatgt cagttcactg cgacctctgc ctccYgggtt caagcaattc
 41401 ttctgcctca gcctcccaag tatttgggat tacagggtgc tgccaccaca gccagctaata
 41461 tttttgtatt tttagtagag atggccatgt tggctaggct ggtctggaac tccctgacctc
 41521 aggtgatcca cccaccttgg cctcccaaag tgctgggatt acaggcttga gccaccatgc
 41581 ccggcctatt tatttcattt ttattttatt attttctttg agagaaagtc tttgttgccc
 41641 aggtctggag gtagtggctg catctcagct cactgcagcc tccacctccc ggattcaagt
 41701 gattctccag cctcagcctc ccgagtagct gggactacag gcgaaagcca tcacacctgg
 41761 caaacttttg tattttttag agagacaggg tttcaccaca ttggccacgc tgggtctcgaa
 41821 ctccctgacct caagtgatcc gaccgcctca gcctcccaaa gtgctgggat tacaggcgtg
 41881 agccaccgtg cctggccttt attttttatt agagattggg tctcactctg tcacctgga
 41941 gtgcagtggc tcaatcatag ctcaacttcag cctcaaactc ctgcactcaa gcaatcctcc
 42001 tgagtagcta ggactatagg caccaccac cacacctcgc taatttatta aaaattcctt
 42061 gtatatagag atggaggtct cactacgctg ccgacagtgg tctcaagaac tcctggcttc
 42121 agatgctcct ccactWtggc ttcctaaagt gctgtgatta caggcatgag ccacagtgac
 42181 cagcMcccc cctctctaata ttcctttatg gtgtcatctg gacaatactc cttgcaagct
 42241 taccatgggc aaggtatcat tctaagcatt ttgtgcataa tactcaacta ctcaagccaa
 42301 ctgcacagct gcctagcagt tcattatgag tgaatgtttg tgttccctgt ccRttcatat
 42361 attgaaattc taactctcat tgtgactgta tttggagaca aggcctttat ggaagtaatt
 42421 aaggtggaat gacRtcataa gggataggcc ctggtccagt aggtattagc ttcttatgag
 42481 aagtgaacc acaaagaac aagcttacta gtcacgggtc cagccagtgt tcaaatccca
 42541 aacacctgct ctctgagccc tgactattgc tttgctagca ttacacatct tatggtttgg
 42601 ctgttaattc ttcatacca gcaccagagt ccaggctggc aaagggttag gaaaccgatc
 42661 atctgcctcc tctacaccca gaacctgtg tggtgaccca aaacaaatgg aaagaaccaa
 42721 cctcagatga aatttgaacc caggctctgta gcctctgcct cctccacagt aggagtttgt
 42781 gagaatgtcc accaataact gtttattaac taaattcctc cacctttcca actccacaag
 42841 gctcaactat tgccccataa tcccacagtg ggctccctgt cgtggcgatg aagccttgct
 42901 ttgcctcact actggcttag gaaggggatg aagttctgct gtctcactag gcaagcaaag
 42961 attcaatttc caaaaatcct aggttaggac cctggggcag ggatgaggag aaaaaggagg
 43021 cacctcaatc ttcctatctc taaacaagca gtcaccacac aggcctcacg gccaggagtg
 43081 acgtagttag cggatgaacc ctgcagaagt gagcgctaata catatccctag gcctcctacc
 43141 gggccagttc acaacctgat cccaacctac ttttccagcc tcagctccag cgacagagtc
 43201 ctccctcccgg cagcgaccga acctccagcc acaatttctc atcctccacc tctagatgca
 43261 gtttccctggg ctccggggagc ccttgccctg cttctccaac gggaaagccc ctttacatcc
 43321 ttcaagaacc cccttcccta gtgcccctcag gaatacttta tggcagtaga gaggttaaggg
 43381 cccacgcccg ctctggacct cagtttccctc atcagtaaaa tggggctcct taagtttgtg
 43441 ggagtgttga gggcggtggg gcctacgaag cgcgcccagg agccgagagt tgcagaaacc
 43501 cggagctcct cgctccctcg aaccgtctgt acgcggcgcc cccgcccagc aggcagcccc
 43561 tggagggcag gaccccggtt ataagcctca gaaaacgtgg cttcggagga cgtggcaagg
 43621 aggactgaac gaaggatgag gagatgaaca aatgaatgga cggaaggccg aatgagggac
 43681 aaaggcttgc aagatggcgt tctctaggac cgcgggagtg gtggccgggc ctacgaggg
 43741 gagggggccg ccggcgccctg ggatcttgca gcgcgggcca cgcgaccggg acaaaaaccc
 43801 aaaacatggc gggctctagg acccccggga ccacaccgcg ccgggcccagc agccgcgcgg
 43861 gccgagcctg ggtgtccgca gcccagaacc gcggagacag ccggcggggt ctaggacctg
 43921 ctggggcccgc aatgcgcccg gggccgctca cagcccgcct gggaaactga ggccagctcg gatcgtggcc
 43981 ggccaacccg gcccgccctc ggcgcccgcg gggaaactga tcccgcgcac gtttccctacc tgatgagact
 44041 gcgtggggagc tgcccggggc cctcgcggtt cctcgccagc acggagcccg gaccctgcca
 44101 tgtgctgact ccgtggcgct ggcgtcggct cctcgccagc agggagcccg ggcgcggcga
 44161 aacagggggc ggcgctagga cccagcgggg ggcggggagg tgggaccggt gaacctccag
 44221 gcggaagtga gggatcttcc tcagctagga aggaaggga ggtctctgtg tgtgctgagg caaggggacg
 44281 cctatggcgg ccaggaagca tcttgcaaga ggcggcctt gtgttagtct ggggccaggt caccggcaat
 44341 ccaggcaggc tgacgggtata cgcccgccctt ggtttagtct aaaggccatg ctcaagctct gcaaaacct
 44401 gtcttcaaga accagaaggt gggaggacaa aatagcaagg agtgggttcc acgaagtttt
 44461 agtccaatta tattccacaa catttccctt aatagcaagg aaaagtgtca ccaaagtacY
 44521 ctccatctgc cttgggaaaa gtccctccaga gagccccacg aaaagtgtca gcaccggaac
 44581 gtggccaggg ctgtagaata tttttctccc tttctgcgcg tattcaatat ccgcgttggtg
 44641 gattctagct gctcttgccg gaagtgtggc tagcWtagcg tgcaaagacg cgcggttggtg
 44701 acctacgtgg gcggagtcag ccgtgcagac ctagaactta gcgcccgaag tgtgtctgcg


```

44761 taaaactgcg gctcggagggc gggacaggca gtgctcccga agcgggaagtt tcgcggggaa
44821 gctttttgcac ctaaggacac ttcctgtttc ctagtaacaa taggaagtgt ccgtagagct
44881 gggagtagac tcctggctca tgccagctgc gccctctttt ctctacctcc ttcctcttcc
44941 ccccttctcc tttccctctt tcccttccct cccacctccc ggggaacctg gctgagtgtg
45001 cgtgtgtggg agcgcgagag ccccccgcaca gccacctctt ggggcgcgcg gctgcagtta
45061 gggtaagggg cccagtgcgc aggcgcgcctc ttgttcgcgcg tccccactg acgcgcccgc
45121 ggcgggaagg agagggggcc gccgggtgcga ggtaggcgctc ctgagaggaa attggcagac
45181 gagatgagtg aggtcagagg acttcattgg tggttgacta ggggagggga cttttgatca
45241 aaggggcttt gtgaggtgag aattccgggg gcaggttcag tgaaggggtt tacggtcgga
45301 gacagttgta ctgggggtccc atgggaagaa gagtcagagt tggagaagga caagacgatg
45361 tagggggcat gagagagcaa gggcttttggg atgaagaccg cctcagtcag ggggtttgct
45421 gttacgtgaa ctagaataac aggcattgcc gtgtgttctg aggattgagt aacacaatga
45481 atatatgttag cacagtgcct ggcacatggg aatataatac tcttcagtag ttgctgtcat
45541 catcagtatt aagagaggag gcagaagaaa aaaatgagaa agactggatg gggtaagatc
45601 aggaggcatg ggagagaaaa ggtaggcaat gaagtgcacat tacaacctgg tattgatgtt
45661 attcccaaga tggaagatag tttgagttca aggggaagtag ataaaagaag tcgctaagag
45721 agtcttttgg ggttttttKt ttttttgaga tggagtctcg ctctgtcacc caggctggag
45781 tgctgtgggt ggatctcagc tcaactgcaac ctccacctcc caggttcaag cagttcttca
45841 gcctcagcct cctgagtagc tagaattaca ggtgccacc accacgcccg gctaattttt
45901 gtatttttag tagagacagg gtttcaccat gttgtccagg ctggtcttga actcctgaac
45961 tcagggtgat caccagcctc ggcctcccaa agtgctggga ttacaggcgt gagccaccac
46021 acctggccca gttaagagag tcttaactct ctttaactctc ttgtcacaag gaaaagagac
46081 cttgtgacac tgaaatgact cgggggtggg ggggaacaag ccagcccttt cctgaagga
46141 ggcctctaac ctctcctctc aggtcctcag ctattaactg gaggaacag ctgctttttc
46201 agtgcttctc agctactctg tttagctgag agatgaagta ggaagatttg gacttctctt
46261 attgaaaggc ctagagaagg ttttgggtgc cttttaagat gtcacagaaa atttttgttt
46321 caggattgta gggagcagat tcctactgtt cttaaaggac agtaatgcct tttgagtctg
46381 gtctgaagaa cataacagg gtgtgatcag aagtaggttg catctctctc aactttaaYt
46441 tccttagcta tacctgtagg gatgacttaa gcctagggga gctcctatat ttgggaagct
46501 tgtgcacagg gaagccttaa atgatgggtgc ctgcagattg gatctagtag aaattaggtc
46561 cttgggcatg gatgcttggg gaacctctca gtgacctcag gtgaacttgt tgctcgtaga
46621 gccaaagggc gaagttaatt caggccttcc ttttgaccac tgccccctct tcctaggcct
46681 tggccccctc accagaggaa ggtgctgcca cgtgtctgct ccttctgaac ctccagggtt
46741 ctgctacgtt gccccatgga ggacacaccc ccctcactca gctgctccga ctgtcagcgc
46801 cactttccca gcctcccaga gctctctcgg caccgagaac tgctccatcc atctcccaac
46861 caggacagtg aggaggctga cagcatccct cggccctacc gttgtcagca gtgtgggcgg
46921 ggctaccgtc accccgggag cctgggttaac catcgtcgga cccacgagac tggccttttc
46981 ccctgtacca cctgtggcaa ggacttctcc aatcccatgg ctctcaagag ccatatgagg
47041 acacatgctc ctgagggccg ccgcaggcac agggccccac gccccaagga agccactcca
47101 cacctccagg gtgagacggg gtccactgac tcctggggcc aaaggcttgg ctctagttaa
47161 ggctgggaaa accagacaaa acatacagaa gagacacctg actgtgaatc tgtacctgac
47221 cccagggcag cttcgggtac gtgggaagat ctgcccacca gacaaagaga aggcttggca
47281 agccaccag gtccctgagga tgggtgcagac ggctggggac cctccactaa ctctgccaga
47341 gccctcctc tccccatccc agccagcagc cttcttagca acttggaaca gtatctggct
47401 gaatcagtag tgaacttcac agggggccag gagcccaccc agtccccctc tgctgaRgag
47461 gagcggcggg acaaattgtag tcagtgtggc aagacctaca agcacgcgcg gagcctcacc
47521 aaccaccgcc agagccacac gctgggcac taccctgtg ccactctgtt caaggagttc
47581 tctaacctca tggctctgaa gaaccactct cgactgcatg cccagtatcg gccttaccac
47641 tgtccccact gcccccggtg cttccggctc cccggggagc tgctggaaca ccagcagtcc
47701 catgaggggt aaaggcagga gccacgctgg gaggRgaaag ggatgccac caccaatggg
47761 cacacagatg agagcagcca ggaccagctc cccagtgcac agatgctgaa tggctctgcg
47821 gagctcagca cctctgggga gctggaggac agtggcctgg aggaataacc gcctttccgc
47881 tgtggggact gtggccgtac ttaccgccat gctgggagcc tcatcaacca tcgaaagagc
47941 caccagacag gtgtctaccc ctgctcactc tgttctaagc agctgttcaa tgcggtgcc
48001 ctcaaaaacc atgtgcgggc tcatcacagg cccaggcaag gagttgggga aaatgggcag
48061 ccatcagtc caccagctcc cctgctgctg gctgagacca cccacaaaga ggaagaggac
48121 cccaccacca ccctggacca tcggccctat aagtgcagtg agtgtggctg tgcttaccgc
48181 caccggggga gcctgggtgaa ccatcgccac agccatcgga ctggagagta ccagtgtca
48241 ctctgtcccc gcaagtaccc caatctcatg gccctgcgca accacgtgcg ggtacattgc
48301 aaggctgctc gccgaagtgc agacatcggg gctgaggggt ccccagcca cctcaaggta
48361 gaactccgc ctgacctcag ggaggcagag gcagccccgc acacagatca ggacctgtg
48421 tgcaaacatg aagaagaggc cacggacatc accccagcag cagacaagac agcagcacat
48481 atctgtagca tctgtgggct gctctttgaa gacgctgaga gccttgaacg tcatggcctg
48541 actcatgggg caggggaaaa ggaaaatagc agaacagaga ccacaatgtc acctcctagg
48601 gcctttgcct gccgagactg tggaaagagc tatcgccact caggcagcct tatcaaccac
48661 aggcagaccc accagacagg agacttcagt tgtggggcct gtgccaagca cttccacacc
48721 atggctgcca tgaagaacca cttgcgccgg cacagtccgc ggcggagcag gcggcatcgg
48781 aagcgggctg gcgggtgccg cggtgggaga gaagccaaac tcctggcagc ggagagctgg
48841 acccgggagc tagaagacaa tgaaggcctg gagtctcccc aagacccttc aggggaaagt
48901 cctcatgggg ctgaaggcaa cctggaaagt gatggggact gtttgaggc tgaatctgaa
48961 ggggacaaat gtgggcttga gagggatgag acccatttcc agggtgataa agagagcggg

```

49021 ggcactgggg aaggactgga aaggaaggat gccagtttac ttgacaactt ggacatccca
 49081 ggtgaggaag gtggtggcac tcacttctgc gatagcctca ctgggggtgga tgaagaccag
 49141 aagccagcca ctggccaacc caactcctct tcccactctg ccaatgctgt cactggctgg
 49201 caggctgggg ccgctcacac atgctctgac tgtgggcatt ctttcccca tgccactggc
 49261 ctgctgagcc acaggccctg ccacccacca ggcattctatc agtgctccct ctgcccgaag
 49321 gagtttgact ctctgcctgc cctccgcagc cacttccaga accataggcc tggggaggcg
 49381 acctcagcac agcctttcct ctgctgcctc tgtggcatga tcttccctgg gcgggctggc
 49441 tacaggcttc accggcgcca ggcccacagc tcctctggca tgactgaggg ctgagaggag
 49501 gagggggaag aggaaggagt ggcagaggca gccctgcac gcagtccacc actgcagctc
 49561 tcggaagcag agctgctgaa tcagctgcag cgggaggtgg aagcgctgga cagtgcaggg
 49621 tatgggcaca tctgtggctg ctgtggtcag acctacgatg acctggggag cctggagcgt
 49681 caccaccaa gtcagagttc tgggactact gcagacaagg ctcccagccc cttgggagtg
 49741 gcagggtgatg ccatggagat ggtcgtggac agtgtcttgg aggacatagt gaattctgtc
 49801 tctggagagg gtggagatgc caagtctcaa gaggagcag gcacccctt gggagacagc
 49861 ctctgcatcc aggggtggga aagtttgttg gaggctcagc ccgcccctt ccgctgcaac
 49921 cagtgtggca agacctatcg ccatgggggc agcctgggtga accaccgcaa gatccaccag
 49981 actggagact ttctctgccc tgtctgctcc cgctgctacc ccaacctggc tgccctaccgt
 50041 aatcatctgc ggaaccaccc tcgctgcaaa ggctctgagc cccagggttg gcccatccca
 50101 gaggcagcag gtagcagtga gctgcagggt gggcccatcc cagaaggagg cagcaacaag
 50161 cccagcaca tggcagagga ggggcccggg caagcagaag tggagaagct ccaggaagaa
 50221 cttaaagtgg agcccttgg ggaagtggcc agggtgaaag aagaggtgtg ggaggagacc
 50281 actgtgaagg gggaggagat agagcccagg ctggagacYg ccgagaaggg ctgccagact
 50341 gaagccagct ctgagcggcc cttcagctgc gaggtgtgtg gccgatccta caagcacgcc
 50401 ggcagcctca tcaaccaccg gcagagccac cagaccggcc actttggctg tcaggcctgc
 50461 tccaagggtc tctcaaacct catgtccctc aagaaccacc ggcgcattcca tgcagatccc
 50521 cgacgttttc gctgcagcga gtgtgggaag gccttccgcc tgcggaaaca gctggccagc
 50581 caccagcggg tccacatgga acggcgtggg ggtgggggca cccgaaaggc gactcgggaa
 50641 gatcggccct tccgctgtgg gcagtgcggg cggacctatc gccacgccgg cagcctcctg
 50701 aaccaccRgc gcagccacga gacgggcccag tacagctgcc ccacctgccc caagacctac
 50761 tccaaccgca tggccctgaa ggaccaccag aggtgcact cagagaatcg gcggcgacgg
 50821 gctggacggc ccaggcgcac agctgtgcgt tgcgccctct gtggccgcag cttccctggc
 50881 cggggatctt tggagcggca cctgcgggag catgaggaga cagaaaggga gccagccaat
 50941 ggccaggggag gcctggatgg cacagcggcc agtgaggcga acctgactgg cagccaggga
 51001 ctagagaccc aattgggtgg tgcctgagcca gtacccact tggaggatgg agtcccaagg
 51061 ccagggggagc gcagtgcagc ccccatcagg gcagcaagct cagaagcccc agagccactg
 51121 tcctgggggtg cagggaaggc aggtgggtgg ccggtagggt ggggactggg gaatcatagt
 51181 ggagRctggg ttctctcagtt cctaactagg tcagaggagc cagaggacag tgtccacagg
 51241 agtccctgccc acgctggtga ctgccagctc aatggacctc ctctgagtca catggatagc
 51301 tgggacaaca gagacaacag ctctcagctg cagccaggga gccactcctc ttgcagccag
 51361 tgtggcaaga ctactgcca gtcaggcagc ctcttgaacc acaacaccaa caagacagac
 51421 cgacactatt gcctgctctg ctccaaggag ttcttaaatc ctgtggccac aaagagccac
 51481 agccacaacc acatagacgc ccagacctt gcctgtcctg actgtggcaa agcctttgag
 51541 tcccaccagg aactggccag ccacctgcag gctcatgccc ggggccacag ccagggtgcca
 51601 gccagatgg aggaggccag agatcccaaa gccgggactg gggaggacca ggtggttctc
 51661 cctggtcaag ggaaagccca ggaggcccca tcagaaaccc ccagaggccc aggagagagt
 51721 gtggagagag ccaggggagg acaagcgggt acgtccatgg cggctgagga caaggagcgg
 51781 cccttccgct gcacccagtg cgggcgctcc taccgccatg ctggcagcct gctgaaccac
 51841 cagaaggccc acaccacagg gttgtacccg tgctccctct gtcccaaact tctccctaac
 51901 ctgctgtctc ttaagaacca cagcaggacc cacacggacc ccaagcgcca ctgctgcagc
 51961 atctgtggca aggcctttcg gacagctgcc cggctggagg gccacgggcg ggtccatgca
 52021 ccccgggagg ggcctttcac ctgcccccat tgtccccgcc acttccgccc ccgaatcagc
 52081 ttctgtcagc accagcagca gcaccaggag gagtggacgg tggccggctc cggtaggggg
 52141 catgaagggt cccaggagga ggtgggcaca cagtggaggg ggaagtccag ccccaaagtc
 52201 ggtgggggag caaggagtga gaggagagag ccccggggat tctaagaggt gggtaggggg
 52261 ttggctatgg ggtgagagaa gtagcttgag gatgtgctga gctgagcacc cgcaagttag
 52321 gtataacaaa tagcagggtg ggttgggcag cacgtggggg cgtggtcagg ccgaggctgc
 52381 tacctgggct cctccattac actgtagcca gaatggaatg gtctttctgt tcagggggag
 52441 gtcactgggt accccctggc tgcctgtgtc ggaaaccctc ctgagtcagc cagtaaagta
 52501 atgacttcca gagaaaaaga ggaagccatt ggtttggtct aggttccatt ctttccctgga
 52561 gcaggccggg tgccagggaa caaggatgg ggcattgggt ccacggcttc cctgctgact
 52621 tggccacgga aactggttca ctggttggca cctactccc tgtccctctt tccctgcgcc
 52681 ttgtctctgc tgcctctctc cttggaaact agacctctgg tcttccctg tcagtgttgc
 52741 tcccatctct tctctaacct ttattcagcc ccttttccct ctgctgccaa cggccttttt
 52801 aggatccaac caaaccaccc tttctacctg cgcacctgac caccctctgc acacctttta
 52861 ctggaggact gagtccacaga taattgtttc cttgaagtcc agggccagct gcagcaacaa
 52921 cagtcattag cccgtgtcac atccctgatc agagggcatc tccgtgggga atcgcccca
 52981 cccagcactg ctggaagccg cRgctgccag ggagtggggc ggccgggttc ctcagcagga
 53041 cctgggctgg cctctccacc tccYctagta gaggcggacc cattccatct agtggccacc
 53101 gagggtgggt ggccctgaga tgggtgggcc ttgacaggcc ttgtcagagc agagggcagg
 53161 tgggagtcc ctgaaagctg aaggaatggc ttaaggata gaagatttct catgacctca
 53221 agggatatga gggaggagcc agtttgccag ggctgggaaa ataattagga ggcctagaat

53281 ccctgtttctc atctgggcct ccggggccag gggcagggga atggcctgca gggctgggag
 53341 ggggtacacg ctgtgcgggg tctgcccctc agttgggtgac ctccctctctc tctcccccca
 53401 ggagccccag tggcaccagt gacgggcaga ggggacttgc cattgcccccc tccaccacc
 53461 cccacgaccc cactcctgga tccttcaccc cagtggcctg cagacctcag cttctccctc
 53521 tgaacttcaa gtctccaaag atcagaatct gggggaggga gcgcgtgcag ggaggggctt
 53581 gatctccaca ttttctcagg agtagttcgg gcatccccat atcttctcct ctccccYtgt
 53641 gaagaggacc cagatctggc ttctttccca aggagggggt ggggtgttcc tcgcgtccct
 53701 gtccctgaag gacctccttc ccccagcctc atcacctgac tcttctcagc gccaccctca
 53761 gcagccagat tgcaacacca gggagaggcg gatgcagagc cccaccggtg ggaaagtgtc
 53821 ctgtggaagg gagccttttg ctacaatttg taacttattt tctaaagtct attttgtaac
 53881 aattttattta agtttaaaaa aaggaaaact gctgcccccc aaaaaaagaa attttcaaaa
 53941 caacgtggct ggcggtgattg tatctgaaag ggtaaaggag gaggaaagct gagacgcctg
 54001 cttggtagca gagttgggtg tgggagtgtc cacagacacc cctgtcctgc aggggtggga
 54061 gtgggacact gtggccccag gcaggttcct tcccacagct gctgggcttc tgggcctgcc
 54121 ctgggtgcctg gaatcacaca tgacagggtg gggaggacag gggcagtaat gccatttgcc
 54181 tgctgtcatt ctcttgctct gagaatggcc aggtcccctg tcagcagctg gttgggtggc
 54241 ctgtggggaa ggaaggaggg tggagtgtgc ctcatcctca cggctttggg cctccctcc
 54301 ctccccattc ctccaaggaa cagggtctgt cttggccgcc atgacagatg agaatactga
 54361 ggctcaaagc gggtgagcag cctgctccaa gtcacacgat gacaaagaac cagaatctga
 54421 atcaaattggg tctgcctgtt gctccaccct acccaaggca gctggagtgg gttagaacgg
 54481 cacgtttctc ctggagagag aagggtcctg gagaggcagg gtttggcagg agggcccggg
 54541 gccacatact tatgttggcc aggcagcttc caggctcagc ctcggtctct ggttcctcgg
 54601 cgaagtagac ctgccagtc aaactgctga cccagtcctc ataggcaggg agcgcggtga
 54661 agaccgccgg cctggcgggg ccttggcaag catctccgaa gctgtgcagc ccggccagga
 54721 accatgtgcc cctcacctca tgcaccagt gtgccccaga caggccctgt cagggtcag
 54781 gtgacactgg gtgacttttt ataggcagct gtgcaggacg gtagagcagg ctagggaacc
 54841 tctggctgtt tgggggctaa ttggcaaaaa ggcttagttt cagggtgggag gtgggtccag
 54901 aggccaaaggc tgggaaggctc gttcttgagc tattgggtga ggggatgcca ggggcctgtt
 54961 aggttaagggt tgggggcctg gggctcacct cacagctggg cagctcacc cagagctgca
 55021 tacacaccat ccccggcaga atagggtcgc catcaccccc aggagctgca tgcagccggc
 55081 tgcagggcct agggcccagg agggtcacgg gcaactgtctg gagggagctg atgcctgtgg
 55141 agcaagggaa agctggctgc cccggcctgc aggttggatg gacagcagcc ctggccctgt
 55201 gcccacctac ctgctcctgg gcggggccgt cccagaacct agccacgctc cccatcaggc
 55261 aggtgggtggc cagSataggg caggcagagg ggccgcaggc tggctcccag tgtcacaggc
 55321 tgggcccagca gcaggagggc catgtcgtag ccccccctcag ggtgggtgta ggctccatgc
 55381 aggatgagct gcttcaggcc ccaactcctcc ggtctggtcc ccagccctac gctccattcc
 55441 tctggggcct ggcgctgtg cagaggcagt gtggacggca ccaggtgaca gggctgccgg
 55501 caggggcagg gggcacagca gagagggatc caagactcac ccaatgaagc agtgggcagc
 55561 agttagcacc gcctcctctg acaccagggc tccgccacag gccagctgtc cctggtgcat
 55621 cagcctggcc tcccagggcc atggggaggg tgctcctgcc tggggacctg ctgtcctcaa
 55681 ggatccacag gctgaaacag ataagtgcct catctgactt ctgtctaagc acttcccact
 55741 tcccatcaaa tcctcacagt agcttttgaa attgaatttt gttcccctca ttactgaagg
 55801 taaccaaagt tccagagagg ttaaRagact tccttgctct gtaactacag gcaagtggca
 55861 gacttgcatg tcgcaagcca gggcctgagc ttttagccct gttggtctga tgggaccct
 55921 gtcccagcct cgtgggaatg cccctacttg tcaactccct gctccaccgg tctgcacct
 55981 ccaggMtggg cctgcctccc gtattcctga ctcattagtg catctcttat catcaagaca
 56041 taatatccgt cccaggaatt actttgcatt caatttgcat gccagtcact taatgccgga
 56101 attctgactg ggagccctac cctgtgcagg ctgcgtgggt cctgtctgga agcctgccac
 56161 ttccccagaa acccaagtca ggtctcagag attcctcttc tcacctaaac tccaaacctg
 56221 tagagtcca aagtgcctgt gcctctcagc cctaacaggg ctgttcccat cccagggggg
 56281 gaaagagccc cctaattagg ctcggcgggtg tggatgccta tgccagttct ctagtcctaa
 56341 ctgaggtttg cttcacagtg gcttctgccc actcccagca tgccccactc gtacctacac
 56401 agctgtcctc atcactcatc tccgggggtc ctgggctctg ggccaggaaa gctgccccct
 56461 gaactcgagc ctgcagccag gaactgtgag cagctgtgtt ggtcagcagc acaggagcgt
 56521 cctcctgggc acagcttgat gcaaagctga tgatgccagc ctgaaccagc tgtccgtcag
 56581 gctcgaggca cagcacaggg ccccgggaat ctccctggag ccaggcaaca aagccaagga
 56641 cagatgcctg agcccagcta tggcagacac cctctgattg cagStctttc cccagtcct
 56701 gtgagtccaa ccccagccc agggttaggc ccctcccctt ctgctccttc tcttctccct
 56761 atcagacctg acagggggccc tgcaccccag gctggggggc cccacatagc atcccaggcc
 56821 gggccgggtt ggacagggtg cgctggtgca gctggttgta gatacagtta catgtggggc
 56881 gactgatgag acgcaggcgc agattgcgta gggctcccagg agctggtgaa agagacgggg
 56941 ctggggctag agtctgggat ctgggaagca agggagactg gaagccagga cagttgggag
 57001 ctgagactgt gacgctgggc aagcagagtg cctctccgag cttcagctctg ggccagcact
 57061 taccatcact ggtgtcctga tcccagccag tggcccagca ggaggctcca aaggggaagc
 57121 gatggggcggg ctggggcagg cagaggggtg tgtgggtcgt ggggtgggcg agctgcagca
 57181 gggccaggctc tgagccctgg ctgtagtggt tataggccct gggcaactgc agggcagcca
 57241 ccccccacctc ttcggcccca gggctgagtc cctcacgctg cagagaacct aggacctg
 57301 accaggaatt cagttctgtt gctgctgccc tgggaaggga aggacaaggt ccaggctgct
 57361 gagtgaagg gtagacagt acaccatggg agaccccaca ggtaggtgga agatagcaga
 57421 gagcactcca cggctttttc tttttgaggt agggctctct cctgtcgccc aggtgcagt
 57481 gcagtggcat gaccatgact cactacaagc cttgacctcc caggctcaag cgatcctccc


```

57541 acctcagcct cgtgagtagc tgggactaca ggcgtgcacc accatgcctg gctaatttta
57601 cagtttttgt agagacatgg tcttgctatg ttgcacaggg tagtcttgaa ctYttgggSt
57661 caagcgatcc tccctccgtg gcctcccaaa gKgctgggat tacaagcgtg agctactgtg
57721 cccggcctca gtctgtgact ttaagcgagg tcattccctt gcaacctgag ttttYtgatt
57781 tgtaaattctt ctacctatgaa aggtgggtgt tacaattaac ttgacaatat gtaccagta
57841 catggcagat tctcagtaaa tggttcttta ttattactct agaggcaggg actagccttg
57901 tggggccttg gacaaattgt ccactcccca gagccggaga ccctgcctga cccagccat
57961 gacttacttt tcaaagcagt gggcagcagt gaggaccag gtgtctgcca ccaggagacc
58021 gctgcagatg tgggctcctt gcctcctcac actggcctgc cagggccact cgccaggac
58081 tgtgttgccc tctgaggct tggggggggc ggggccacgc tgtccacagg ctgtggaaag
58141 gagttagtca cactgacagc agatacctgt cctgacctca cccagtccc aaccagacc
58201 caagtaagac ctaggccccg tgtccccaga ccttaccacg ctgagcgggt tgaagacctg
58261 ggaagagaga gacacaggta agatgcaggg actccaggcc tgcctagctt tggggaggag
58321 aggggatggg ctgggggggcg ggcccagggt ccttgccctgt gactctgatt accttaccag
58381 cccctcccag aatgaaaata tttatatgag gccgagacag cttttatttg aacctattca
58441 gtgtgcacac tcagtaatta attctccttc agctgtgctc agcactctgg ggcttgggggt
58501 tcagcttggg agtaggccag ccctcctcca ggcttcagaa cccccaactc ctgccccgc
58561 cactgagtca gccaggcggc ctgtgtgtgt agagagcatt agcttaattg tctcttagc
58621 agcagaggcc taagaggaag gattagaggc ctgcatcatt tccaagtggg gagggcccca
58681 agaaatggag acttacctca ccctgggtcta gagactcagt ctccccacc tcccagaaa
58741 ctgtctgaga gcccggccaga gagaggggccc ctgcccaccg cccctcacag gcacacaggc
58801 accccatgag acagctgagc caggctgccc agaggatgga tgaaaagaaa gggaaactga
58861 ggccagagga gccagagatt tgctgacgt cattgtggaa gtcgaggggg aggcaggcac
58921 aggacacacg caggcagcac ctcacacaca cacaagacca caggccccgc caacgcaaac
58981 tgcagctggc ccgagaaaat ctcatccatg ttgacacagg tggccacata taccaccca
59041 cagagtccta cggagttaca tccccactgg tggactgtcg cccacaggcg gtccccccac
59101 caagaagcag ggactgctgg ggcagagatg gcccctgagc cccaccagg ccacacccat
59161 accccagcac atggcggctt accctccatg aggactgtgg caccgcgat gagcagcact
59221 gggccccagc accacttcat gctgccccgg gccactctgc cactgtgct ccactctgag
59281 agaggccacc tgggtctccc tggctccacc tctgctccac ctccagttgg ctaggattca
59341 gctgtctgct tgccctagcc agcagttcct agctctgggg ctgtggctgt gtgaccctag
59401 gcttgtcacc accctctctt gggccttagc cgtggagcca aattgtctgg gtttaaactt
59461 gtttccttac tacttgagtg gcctgggaga gctaacctgc ctgtgccttg tctgagaaac
59521 agttgttgaa tggaaaacgt ctcaatgaca gcctggcaca gggcaagctc actcccagca
59581 tgaaagtgcc atcctggaac catggagggc acgtgggcag ctctcccag tcccacttt
59641 tcatttccac tccccactt ctctccagc cagggctagg tgggtttcac atgccttctc
59701 ccaggtctgc tcagagacag tgtgtgccag gctgagtggg gaggagccag caccactgc
59761 tgcttgctcg ctgtgagcct ttggcaaate ccagtatctc cctgggcctg ctggcttctt
59821 gggaaacagg gtgacagcgg tgcccacctt cctcataggc gcagaggact cggtcaggcg
59881 ggaagaacac tttggcgcgt gcctcctctt cctcttccca ctctaactc aggctggccc
59941 agaccattca agaaccctga cccaagaca gaggcagctg tgggtaaggt ttagcatata
60001 ttatagatgc tggccgggca tgggtggctca cgcctgtaat cccagcactt tgggaggcca
60061 aagcaggcag atcacctgag gtcgggagtg cgagaccagc ctgaccaaca tagagaaaca
60121 ctgtctctac taaaaataca aaattagcca ggcctgggtg cgcctgctg taatcccagc
60181 tactcgggag gctgaggcag gagaatcact tgaacctggg aggtggaggt tgtgggtgagc
60241 cgaaattgtg ccattgcact ccagcctgga caacaagagc gaaagtccgt ctcaaaaaca
60301 aaccaacaaa aaaaaagca tatagatgct ggagccagat ggaccagggt gattcaaactc
60361 ctgagagcct cctgcagtag ctgtgtgatc tcaggcatac taattagcca ctctgtccct
60421 atcatcaaga tagggataat aatagtaccc acctcataaa tcaactgtaa gattaaacga
60481 gtttaacacg ttaacacaag tttttttttg ttttttgttt ttttttggag acggtcttgc
60541 tctgttgctc aggttgaggt gcagtgatca tggctcactg cagcctcaac cttctgggct
60601 caagcagtct tcccggcagc ttcccgatta gtggggacta taggtacata caccaccatg
60661 cctggctaatt tttttttttt tttttttttt gtagagacag ggtctcact attttgcca
60721 ggctggctcg gaactcctgg cctcaagtga tctcctgcc ttggcctccc aaagtacagg
60781 gattacagggt gtgagccact gcaccctgcc aacacaagtt cttaaacagt gcttggcatg
60841 taggtaagtg gtcagggcct aataggcaaa acaaaaacct tcacaacctg gccctgacct
60901 tccaaggcta ccaatactgg cttggaatgg tcgataaggc aactggaggg gttaaagtta
60961 aactcaagga agaacttccc agcaagcatt tacagaacca gaagggcagc ctgccccttc
61021 aggtgtgtgc tcagccttcc caggagagga ggcctggctc ctgtgggcag caggagcgag
61081 ctgccagcct gtttcctggg ggtggggggc aatgggtgcc caggccttgc tgactccaca
61141 cactggagat gagactaccc ataaccaccc tcccagcag gccctccact ctccctctga
61201 ctcacccttc ccagctccag agaaggcaac accgaggag gcccagcacc acagtccatg
61261 gcagacacat ggttcagact tggctgattg atctaagaaa ctttattgct caRaaccttc
61321 cctccctggg caatggaaag agctttggag accagcccat ggggacagag tcagaggcac
61381 tgggtgtaaa aaagagcgag cgtgtggcac atttgggtcca ttgtcatgtg Ygggtatggc
61441 aggaggaggg ggtaattctag aagccccaca tctagggcct tctagggacc cagatatgcc
61501 cccttaggca aggtcacat gccaaagcaa agcagatgag gtcagcctgg cttgggttga
61561 gggctcagtg cctcttagcc ttgccctggg gttcttggac cttccggaaa ctgagccaca
61621 tcaggctcac gttgatagca taggtgggtga tacaacaat gcagaaatca tagagcacga
61681 agaacaggat ccaggccaRg tagacagaac cagcgagaga caccagggag ctcagcagca
61741 tcaggacaga ggcccagcgt gtccgcaggc aacctgcaag gcagaagagg gtccggtgtg

```

61801	ggcttcaggc	actggccacc	tcccgaacac	tccatgatgt	cactgcacta	cctagatgcc
61861	aggagctgct	gggaagggtc	tctaaaacaa	gaggctccag	ggcagatgtg	gtggcttacg
61921	cacgtattcc	aaacactctg	ggaggccgag	gtgggaagac	tgcttttaggc	taggagttca
61981	agaccagctt	gggcaacata	gaaagacccg	atctctatca	aaaatttaga	aattcagctg
62041	ggcacggtgg	ctcatgcctg	taatcccagt	atcttgggag	gccaatgggg	gtggatcacc
62101	tgaggttagg	agttcgagag	cagcctggcc	aacatggcaa	aaccccatct	ctaataaaaa
62161	tacaaaaatt	agccgggtgt	gttgatgggc	acctgtaatc	ccagctgctg	gggaggctaa
62221	ggtggagaat	cgcttgaacc	taggaggtgg	aggttgagc	gagccgagat	catgccacca
62281	cattccagct	tgggcagcaa	gagcaagact	tcgtctcaaa	aaaaaaatgc	ccggtgaggt
62341	tgactcacgc	ctgtaatcct	agcacttttg	gaggccaagg	cggatggatc	accaggtcaa
62401	gagattgaga	ccatcctagc	caacatgggtg	aaacctgtc	tccactaaaa	atacaaaaat
62461	tagctgggcg	tggtgacacg	cgcctgtagt	cccagctact	caggaggctg	aggcaggaaa
62521	attgcttgaa	cccgggaggg	agaggttgca	gtgagccaag	atcgtgccac	tgactccag
62581	cctggtgaca	gagcgagact	atgtcgcaaa	aaaaaaaaaa	aaaaaaaaaa	aaaaattagc
62641	tgggtgcagt	gacatgccta	tagtcctagc	tactcaggag	gatcgcttga	gccaggttac
62701	agtgaactat	gattgtgcca	ctgcactcca	gcctgggcaa	cagagcaaga	ttatttctta
62761	aaaaaaaaaa	aaaagaaggc	ttcaacaggt	cccctccaag	ggactggctc	ctgaagctct
62821	tgccattgcc	caggagggga	aagttctgag	caataaaaat	tcttaataaa	atcgccaag
62881	tctgaaccat	gtgtcagcca	ggaccRtggt	gctgggcctc	cctcagtgat	gccttctctg
62941	gagctgggaa	gggtgactca	aaggagcgt	gggagcctgc	tgggaagggt	ggtaatggat
63001	agtctcatct	ccggcatatg	gcatcagcaa	ggcctggggc	gccatcgtct	tccactccct
63061	tggttcctct	ctctgttctt	atgggactag	atacaaattt	tcctgctgag	cactaaatga
63121	gacaaaagat	agctcatgct	cagcttctcc	ttaaaaagga	atttcggcat	cttttccaca
63181	aaactggggt	gttggtgggg	catggtagct	cacgcctgta	atccccccag	cactttggga
63241	ggctgaggca	gacagattgc	ttgagaccag	cctgggcaac	atggcgagac	accatctcta
63301	ccaaaaaaaa	acaaaaacaa	aaattagctg	ggcatagtgg	tgacgcctg	tgattccagc
63361	tgcttgggag	gctaagggtg	gaggatccct	tgggcaggga	ggcagagggt	gccatgaact
63421	gagatcacgc	cagtgcacac	taagggcac	ctagacctca	ctttgggcaa	cagagccaga
63481	ccctgtctca	aaacaacaac	aaacaaaaaa	cctggggacc	taggatgtct	ttaaggggcc
63541	ttcagcctct	aacagtactt	aaaccaatta	aaagactcct	gttagttacc	tccccacatc
63601	cccacccgca	ggacgctcSg	tgatgagcag	ctagctggct	gtcagctgtg	tggatcacca
63661	agattgcatg	gagtggggct	gagctgacca	agggggatga	ggggcggggc	ggggcgggca
63721	gggagggggc	ggagccactc	acctaacaat	agctgtagtg	tgtagaagat	gcaaccgaat
63781	atgctgttgg	attgattgag	gatgctgtcc	tgtcccagca	catgctccac	cagcccga
63841	cccctgcccc	acctggcaga	ggggtgggg	ggggtggaac	caggttagga	ctgtcaaccc
63901	agtgccttgg	accccgcccg	agaaagggtga	tttccaagaa	gccacctggg	ctatcctctg
63961	ttccccgacc	tcccatccta	gtccaagggt	cgatgatctc	ctggcacccg	gcacctttgg
64021	ccacgtcagg	attccatgtc	actgacccta	tcctccctc	tccccagacc	aggcccgga
64081	gtggctactc	cgtaggccct	gcttttcatc	ttagacctta	agtaagtctc	tttttttttt
64141	tttttttttt	tttttttgag	acggagtctc	actctggccc	aggctggagt	gcagtggcgc
64201	gatctcggct	cactgaaacc	tccgcctccc	gggttcaagc	gatttctctg	ccttagcccc
64261	cccagtagtc	tgggattaag	gcacccgcca	tagcgcccga	tttaattttt	tatttttggg
64321	agagacaggc	tttcaccatg	ttggccaggc	tggtcaactc	ctgacttcaa	gtgatccatc
64381	cgcctcggcc	tcccaaagtg	ctgggattac	aggagtgggc	caccgcgccc	ggcccttaag
64441	taattcttaa	aatggcaagg	ctgggtataac	gggttcaactc	gttttgcac	agagactggg
64501	agtcgggggc	agattatctt	tgccctggac	cccagaatct	ccagctccct	ggccactcac
64561	tcgcctcctc	tgtattccgt	cattatgcta	acgcctggcc	atcacgcaca	gccagaccgg
64621	gccaccttgt	tcctgggcgc	agccatcgcc	aacaccccc	ttcMctgcg	cgcctcctt
64681	gagaccatcg	tcaatctcta	ccgcoatcct	gcctccccgc	ctttcctggg	caccgttatt
64741	ccttggcatc	caattcacgt	gcgagtcccc	ggaataatcc	cagtccccag	cactgtctgg
64801	tcccttgcc	cgcactctta	tttcgaacac	cagtatcgct	gggtagctca	gcccctgtgc
64861	aacgaccccc	cgagcagtc	agccccgtgt	ccgttccccg	ggcacaccga	tcccagactc
64921	cagaataatc	atctggcatc	ctggccgccc	tgctccgagg	ccccacgcct	ccactcccg
64981	tgcacacctg	gaggagaaga	cgcgcgacac	gctgatggcg	gtgcccacgt	cgcagagcgc
65041	gcggtaatcc	cggtcccggg	cgcgcgccgc	cttcacgtgc	agcgcgtaga	gcgagagcac
65101	taagcccgtc	aggcaaagag	cgagccgcac	ccagccaggg	ctcccccagg	tgctgcccac
65161	tatctccagg	ttccgcccga	ggcgccccgc	gagaaaacca	gccacggagc	aggggcccgg
65221	cggcggaatg	ccgcgcccc	cctggccctc	tgactcggcg	attggccggc	cgtgctcgca
65281	ctccacgacc	caaattggctg	ttccaggggc	ctagtcaagc	gggcgagtta	ggaaaacagc
65341	gaagaatgcc	gggactagtg	aagcgggtaa	gggacgtgcg	gaatcgcggc	cccagcggct
65401	gccaggcatg	atgggagttg	tagtcggcgc	ggctgcaagg	catcaaggga	aatgaagtct
65461	ccacagattt	aaaaactgtt	ggccgggcac	gggtggctcac	gcttgtaatc	ccagcacttt
65521	gggaggccga	ggctggcgga	ttacctgagg	tcaggagttc	aagaccagcc	tcgccaacat
65581	ggtgaaaccc	catctcaact	aaaaatacaa	aaattagccg	ggcgtgggtg	cacatgcctg
65641	taatcccagc	tactcgggag	gctgaggcag	gagaattgct	tgagccgggg	agccggaggt
65701	tgcaagtgag	cgagatcgctg	ccactgcact	ccagccaggc	cgacagagtg	agactctgtc
65761	tcaaaaaaaaa	aaaagaaaaa	aaaaagtgtg	ttagtgtggt	taacagcatt	tgcgcttacc
65821	ctatgccaa	tcctgttgta	agaattgcag	catccgggac	ctagagacca	gcggatcagg
65881	ggatccagcg	aatacggcga	tccgattcgg	gaaccaagca	tttccccctga	aactatttca
65941	ggcaccattc	gggctgcagc	ctcccatcct	cccgggtcct	gcctcaccag	tgcttccctg
66001	tggtcgggtct	ccctttctcc	catacattca	cagaaccact	cctttggcca	cacacaccct

1261	gaaggaaaag	ctggaatact	gtgagagact	taccagtggc	ctgtctgcgt	gtaactaact
1321	cctcatcccg	acttggtcac	gcaaaggaca	ggtgaccata	cctccaggaa	ggtggaaagg
1381	ggccctacat	gagtgaagag	ctcaagtcct	gcccaagtgg	aatctgtgat	tctgtgatct
1441	aaagaaagtt	tgtggctatt	tttagaaaact	aaagttttatc	tcatattgac	acaaactcaa
1501	aaatcaatga	tacttttgaga	tatgtcatat	cacaaaaaag	atcttctcctc	tagtacatta
1561	tcattttaacc	aatacaaaaca	ggtctgggcc	aggtgctgtg	gttcatgcct	ataaaccag
1621	cacttttgaga	ggctgagggg	ggtggatccc	tagagcccag	gagtttcagg	ccagcctggg
1681	caacatggtg	aaactctgtc	tctaccaaaa	gtacaaaaat	tagccaggta	tagtggcaca
1741	cacctgtagt	tccagctact	aaggaggcta	aggtgagagg	accactgagc	ccagggacgt
1801	agagactacg	gtgagacatg	attataccac	tgcactccag	cctgggcaac	agagggagac
1861	cttctctcaa	aaagaaaaga	aaagaaaaag	aaacaggtct	aatttgttca	tctaagcaat
1921	gataagattt	atatgaacat	aagttgcttt	attgatgaaa	aattgaacat	aatctaataca
1981	agcctctaaa	tttaactgcc	aatttatagg	aaaagacagg	acagaacctc	caggaatgca
2041	atcattttata	tctagaatgt	ggaagattct	gcatgacaaa	cgacttggat	tcttcaacat
2101	gtaaattttca	aggaaagaga	gagagagaga	gataaaaagg	cttgtttcca	gatttgaatg
2161	acatgttaat	agacatttat	gagacaatca	aggaaatttg	aacatggact	gcatattgaa
2221	tgttgaggga	ttatagttaa	tttttaaagg	tacaattgtg	atactgtgat	tatattttta
2281	aatgcgatca	ttatctttta	ggagcactaa	aatattttact	aataaaaatta	taggattttac
2341	ttcaaaaataa	acaacgataa	taagattacc	atgaatagtg	gtgggtgaaa	tatacaaggg
2401	gcttattttga	catttccata	ataaaaaaca	cgaatgaata	acaaagcatt	atagaaattc
2461	aagtaaaaaa	tagctcgtgc	ttagtaataa	atcaaagcgt	gctggacact	ttaaataata
2521	aacaaagata	agatcttgcc	ctctagaaaa	cagctctaata	tcaggacaga	cttgctcaca
2581	tcagatggaa	gagtcagaat	gagatgtgct	gagtagaagg	tagaacggtc	gctagcagag
2641	ggtgggaagg	tggatatgtg	gggggagagg	agaaagagag	gttgattaat	gggtacaaac
2701	agacagttag	atggaaggag	tgagatctgt	tgttcgacag	tagagtaggg	tgactacagt
2761	taacaacaat	atctgcataat	ttcaaaaatag	ctagaagaca	ggacttggaa	tgttcccaac
2821	acatagaaag	gtgatgaact	caaggtgctg	aacaccccaa	ataccctgac	ttgatcatta
2881	tgcaataaca	aaatatcaca	tgtaccctgt	aaatatgtac	aaatactaca	tatcaattta
2941	aaaatttttca	cacaagaatg	agatgtgctg	atgcatgtgg	aggccctagc	tccagactgg
3001	gtgtaaactt	caagccactg	aagatcttat	ttccaaggtt	tttctacttt	gaaattccaa
3061	acttattttt	ctagcagatt	tataagggac	acgggacaa	ataaacttgt	taaagtgaca
3121	agagaaagta	aatatgccct	taaattttata	ccaaatcttc	tgacaagtct	tgactgataa
3181	ttgttttcctt	caaattttgtg	aaaaacatga	gagaaaacgt	gtttgtatct	cattttttaag
3241	tgtggacact	tggcattgct	cacggcttcc	aacggaataa	aatagggctt	agttgttttc
3301	cattagcttt	ttcctttgtg	tgtgtgtgtg	tgtgtgtgtg	tgtgtgtgtg	tggtgtgtgt
3361	acataattggc	tctaagcatt	tattagccca	ataattttta	gtgaaactct	ccactttctca
3421	atatctttttg	ccgtattaga	tttttgaac	atgtgctaaa	ggttaaaaca	ccttttcccc
3481	ttcatgaagc	ctgagagaag	tccggttttct	gggttttctc	aagacaaccc	agagggttttg
3541	tatacgtctg	tctaaaaagt	ctcagatttt	tcttgctaata	tgtgcacctt	cataatcaag
3601	cagacaaatc	agaatattat	tttggtgagg	ccatcatcta	aactaacagt	ctttatgtac
3661	agaagcagca	ctgaccgggt	tcatactcct	cagttagcaa	gtcaacatct	tcctcctgcc
3721	agcaaccocat	cccagaatat	ctgtggctta	ttaatactta	tgaaaacaac	agtcttcatt
3781	atcttactaat	taggagatga	tcagatgtat	ctattgatag	caacaggcta	tttaaaagtg
3841	aaataatcta	tcaaacagat	tttttatcaa	ctcaaagttt	ccagttagat	atcttttcatt
3901	aaattgattg	ctagattgca	gccacaatca	aacttaagta	ttataagaag	tttggttggt
3961	cttttaaaaat	catgcaaaaa	ttcaaggggt	gctattaaat	atagaattcc	aaatgtataa
4021	agtcttgtcc	taaaatgggtc	aataaaaatga	accagtcac	tggttcattt	atagggggcc
4081	agtccactac	attaatttgg	atgttcttcg	tctgcatttt	catgttttca	cacacctgca
4141	gtcattgtgt	acaattctgg	actcttgatt	ttcattttagc	attctgcgtt	aatattctga
4201	catgttgctg	ccaggctctt	atggccacca	cttttaattg	ccagaaaata	tttcatgtag
4261	tgaacatttc	ataaattact	taaccatgtc	ccaattattg	gttattttaag	gaattttaaaa
4321	ctaaaacacc	actcttgtga	caaagttctg	atgtatccag	atgtactcat	gccaagtcgt
4381	ccatcaatag	ttctgctaaa	ccctgtcaga	gcctttttct	gaagggaacc	aggaaacatc
4441	tcacaacaag	aagcttaagg	cctctacaaa	atgacttcag	ggttaggatt	tcaatttcac
4501	tctgaggcac	atacaggaac	cactaggtta	tttggttag	aatggaggga	agtgtcattt
4561	tgtttctgtt	cggcctgcag	gaagctcctt	cccaggccct	gcattgcca	ttgaacaatt
4621	gaacaattct	cattgttcaa	ttcccaccta	tgagtgagaa	catgcattgt	ttggtttctt
4681	gtccttgcca	tagtttactg	agaatgatgg	tttccagctt	catccatgtc	cctacgaagg
4741	acatgaactc	atcatttttt	atggctgcat	agtattccat	ggtgtatatg	tgccacattt
4801	tcttaatcca	gtctatcact	gatggacatt	tggtgtggtt	ccaagtcttt	gctattgtga
4861	atagtaccgc	aataaacata	cgtgtgcatg	tgtctttata	gtgcctagaa	cataatagga
4921	gctccagaaa	tactgttgaa	aaaatgaata	aattgagcac	actaagtgtc	tgaataaaat
4981	accctgacca	taccctaaa	taaacaacat	aaataagcaa	atcttcaattt	ctcggaagag
5041	ttatatattta	gtgtccaatg	ctcttgttat	gcagtaattg	catctttgat	tattcatatt
5101	cgttagagct	tccagaaagg	agtattgcaa	atcacacggg	cctctgactc	tcatgaccaa
5161	atccccctgt	cactgtcctt	gttctctgat	ccttcctctg	ggccctcgga	aatgctgggtc
5221	tccatcaaat	tgctgtaaac	agttttcaga	aaaagttctc	tttggaagt	ttcaagagaa
5281	aaccacaaat	ttcctggaaa	tgcttcatgc	ttcatgacat	ttaaggcttt	cagagccttg
5341	aacttcagga	gcaagatagc	tggttaggtct	tctggagggtc	ttgcctaacc	tgagaagggtc
5401	ccagagaatt	tgtgcataga	acctcccagg	aagcagtaag	acaggctggg	gcagtcccac
5461	aggatgagaa	aggtaagagc	ttaccaatgt	ctccagtttt	gtaaatgaat	gttcttagca

5521	tttttgggtga	ggagaaaaaaa	atatcaaacc	catcacagac	agatcagcag	tctcttgacc
5581	taggtcactc	aaggggttct	caacaatcaa	ttctaaaatg	caagtgaaaa	atgtcaatat
5641	aaggctagac	acaggggctc	atgcctgtaa	ttccaacact	ttggaaggcc	aaggcagacc
5701	tagaactttg	taaatctgag	attttgctcc	atgactttgt	ggatactttc	tactaatacc
5761	acctacacaa	aatcttcaac	caagaatctt	aattgcattt	atcaacttgt	gtccttagat
5821	cataacattt	agattcattt	gaaagaaatt	tattgaagta	aaagaaataa	gaagaacttg
5881	atagcacaaa	acaaagaaaa	cccagaaaga	gagagagaga	gagaagcaga	aaaactaaac
5941	actgaaaccc	agagagagag	agagaagtag	aaaaactaaa	cactgagtct	taatctgttc
6001	tgccactagt	cagcagcctg	cacagagcac	tttaatgtat	tctctgtcca	ttagtttcct
6061	tgtttatgaa	agtatatagc	tccaaaaaaa	ttctgtgttc	tgatttttgt	ctctccaaac
6121	cacaaccagt	cccctgctcc	cttctctcct	cctcctcctc	cttcttcttc	tttctctctc
6181	tctccctgtc	tctctctctc	tctctctctc	tcccccttcc	cctctcccc	accacccac
6241	ctcccaaccc	ctgcatacac	ctaggacacc	tccagcatag	gttactacca	attttgcaca
6301	cctccagcaY	aggttactac	caattttgct	gggtttatct	ccttctgtcc	tttccgcttt
6361	gatctgagga	atagctgaga	tttaggacag	caacaagggtg	tacctccttc	caggttataa
6421	aacaggatta	atgattaggt	tcaaggcccc	ttcctagtca	ctcagtaaag	tctgtgcact
6481	ggaaaactgt	ggtagcagtt	ttctgagcat	tagaaaactg	tggttctcac	agaggctgga
6541	tgagtcaaca	ctgccatctg	goggcctctt	ggagggtgat	gtggagcctg	gctttcattg
6601	aagaatgaag	gtcccttgat	ttcctgaccc	tcagccaact	ctccagcagc	ttctcactgc
6661	agaagagggtc	aggccattgg	tcagcttgag	gacaaagtgg	gaggatcaca	ctttcgatca
6721	cctatacttt	ctaacaatca	gccctgtgga	catctgtctca	cgccccatgc	tgttttttaa
6781	atattttccc	attatagaaa	tatttttcaa	agatgattca	caagctccag	gagccattca
6841	gacaagggtg	agcaaattgg	cagctaaact	cattcaagag	tgagcagat	gcacatgaag
6901	ctctgtctgg	cggaggaggc	acaagacacc	gagcctggct	gggagggtgc	tcatgacaag
6961	agtggggcca	caggcctctc	ctttcattgg	acatagtggc	catacaaagt	ggctgccttg
7021	aaatgcaccc	acatacacta	tcggtcctcc	cggcttaggg	agaaaactag	cacagtatgt
7081	caacagataa	atcagcgcaa	tcctgtgggt	gaagcagtgc	accatactc	ttcattctgc
7141	tgagcggaac	tcaagggtga	gacacttgta	ttcctaactc	cacttgcttc	caggctcctc
7201	caacattcca	aattgcccat	ggacagagct	actaccctc	catagaagtg	acaacttgaa
7261	ataaaaagatt	tgaagctcct	tcccacgttt	agaccagggc	ctgctgctag	gaactccaga
7321	ggagggtatg	aaagaagttt	gcactgctca	cagatttaat	gtttctctca	caaccagaag
7381	taggcagcag	gatggatttt	caatcaacac	taacaaacgg	atcactcctg	ggctccttaa
7441	acaagttcca	tgtctcttta	taggttttag	gtgcctccta	tgtgttcaga	cttdgtataa
7501	tggatatata	agaaaagtaa	atgggagggg	caatatttaa	gaaataacag	caaacaattg
7561	cattcatatt	taatataaac	tacaagtatc	aagttaatag	acgctcagaa	gaaattcata
7621	aaatctagaa	aagttgggaa	aatctcaata	gagaaaataa	aacttgatct	ggactttaag
7681	agtatgattt	ataaagttca	aggggacagt	acacaaagtc	agacaatgtt	agctgaatca
7741	ctgaagaatg	agaatatcac	accacttaa	caaagcagcc	cagctagtta	aagaagtatg
7801	ttgaagagggt	agggagttgg	gtgggggagg	cgaggatggc	gtggagggtat	ctgaaaacta
7861	tcaaccttaa	ataatgagat	ttagaaaata	tgattaagta	gagggttaat	tcgagtgcag
7921	agcttgagaa	tggccacctg	gaaacactga	ctctaaacca	gtaagggttaa	tgtttcaaag
7981	tggagaagtt	aaggtttcac	ttagaaattt	tagcaggatc	acattttcca	tacaagacca
8041	gtgcattcgc	cacagcaatt	tgattgggtta	tagattgctg	ctcattccaa	gattacttta
8101	ttactctgtg	cggaggagta	gtgatttgag	gggtcttatg	tctgggtgct	ttttgtcttg
8161	tttacagggg	aaaaggcaga	agttgcgcct	gcatgccgca	taactcaggg	tctgcatagc
8221	cacatgtctt	tcaaggctca	gaataatttg	aagttccaac	agctttaagt	ttgaattaat
8281	ttcacaaagc	ggagaaagac	ttggacttcg	tgcagtaatg	aagaccaccg	atgggtactg
8341	aacagctctg	gtgggtttgc	actcagagaa	aggagcctaa	gatgcagaag	gtgcagtgcg
8401	gcagcagcca	tctgctcttg	tgctgctgag	cagagcatga	tgggctgtca	ccgctcacgc
8461	gtgttcttta	cctgctgact	cacctggcgg	catgggctgc	atatggggtc	ccagctcctt
8521	aagctcctgt	caggcccttc	tgcaacttct	cccaagctct	tgggccaggt	gcatgtctag
8581	ccatgaaaaa	ggaggccagt	acctgatcac	taagtgaag	ttctaaggta	gtgggactgc
8641	cacagggtgtc	ccccatggtc	ccaggtcaca	atccagtctg	ttgaccctcc	tccttttgca
8701	ccatcgcccc	tttgacagcc	tgtgctatgg	gttttaggct	cctagcacca	aacagaaaca
8761	ggcttatata	gatcatctaa	tcagctcttc	ttatgtgagg	ccgaactctg	taataaatct
8821	ttttatgtct	cctagggtct	ctctgattga	acctgtctga	tgaggagtta	aagaagttct
8881	caaattgtgt	atgcataaga	atcacctggg	atttctagct	cagagactgg	gacaataggt
8941	ctattgaacc	taggagttca	ttttgaacaa	gtgctctacg	taattctgat	acagggaatc
9001	ttccagttac	agtttgaaat	tcacaaatac	aaggaaatgag	agacctagaa	tcagaaagca
9061	tgttaataca	cttttgggcc	attaagtgtc	caccaggtta	acaggtacag	aaaggcagaa
9121	aaaggaaacc	tatcagggtta	ataattatgc	cttttttttt	tttttttttt	gagacagggt
9181	cttgctctat	caccaggtct	ggagtgcagt	ggcacaacca	cagctcactg	cagccttgac
9241	ctcctgggct	caagtgatcc	ttccagttca	gcctcttgag	taactacgac	tacaggcatg
9301	tgccaccatc	cctggctcat	tttttgtaga	gaggggggtt	ggccatgctg	cacaggctgg
9361	tctcaaatcc	ctgggctcat	gtgatttccc	cacctcagcc	tcctaaagta	ttaggattac
9421	aggcgtaagc	cactgtgctt	ggccaagaca	ttttggtaag	aaatattatt	ttcctactaa
9481	attgtctaca	ttccccttgg	gtaggcttgc	aaagtactg	tgactacagc	aggagctatt
9541	gctgcatggg	aaatatggag	acacgagtgg	tacctggcag	tcacgggctc	agtttggttc
9601	taacctccca	agtcagcaca	gccccactga	gcagactgcc	ggaaagtatt	tatgccatct
9661	gtcggataat	taagacaaat	ccaaacatct	acgtgcattc	tgtgtgtata	aatggagtca
9721	tggccaacct	ctcaagcagt	tttccatcaa	tcacttgtaa	tattaccaga	tacttccaat

66061	tgacagtatc	ctaacctctc	tactatcatg	gcgcccgcct	ggcaacacct	gagcttgcat
66121	caactcaaca	gtcagtctct	cctttccaag	ctgtgggcca	gatgaggctc	ctccttcaca
66181	gacgtcccat	ctgatggtga	cccatctctc	ctacaccttc	aacctctcca	tcctcccat
66241	ctacactgca	acttgtttct	ctttcccatc	tcagaaacag	caacaaatct	cccttcacta
66301	agaggtcctt	caccagcctc	ctctcccggc	attatcccat	ctacccctcc	acattcaagt
66361	ttttggaaag	attctacact	cccagtctct	acttcctcac	ttcttccttg	ctgcccacgc
66421	cataaactag	ctgctgcctc	cagcattgcc	ctgacacctc	gtggctggtg	tcaccaagac
66481	gctagacca	atggttattt	atttatttat	ttacttattt	tgagacggag	tctcactctg
66541	tcgcccaggc	tggagtgcag	cggtgccatc	tcggctcact	gcaacttccg	cctccagggt
66601	tcaagtgggt	ctcgtgcctc	agcctcccaa	gtagtttgga	ctacagggtg	ctgccaccat
66661	gtctgggctaa	tttttgattt	tttagtagag	acagggtttc	accatgtttg	ccaggcttgt
66721	cttaaactcc	tgacctcaag	tgatccaccc	acctcggcct	cccaaaatgc	taggattata
66781	ggcgtgagcc	accgcacccg	gccaatgggt	gtttttcagg	tcttctcttg	cttgacttcc
66841	cagagggatc	ccttactggt	gcacctaccc	ttctgggaac	tctcttcctc	tggcgtctgt
66901	gatatttccc	tctcctgctg	gctcctccct	ctccagatgc	tgtttctcac	atctactctc
66961	ttctagagag	tgtggtagac	agaataatgg	tcaccaaaaga	tgtccctgca	tgaatccctg
67021	gaacttgtga	atatgatagg	ttaaatggcc	aaaagggaat	taagggtgca	gatggaatta
67081	agctgaccaa	tctcctgatt	ttatttttatt	ttatttttgt	tttgagggtg	agtttcgctc
67141	ttgttgccca	actggagtgc	aatgggtgtga	tctcggctca	ctgcaacctc	cgcctgccag
67201	gttcgagaga	ttctcctgcc	tcagcctccc	gagtagctgg	gattacaggc	acccgccatc
67261	atgcctggct	aatttttttaa	attttttagta	gagacagggt	ttcgctatat	tggccaggct
67321	ggtcttgaa	tcctgacctc	aggtgatccg	cccacctcgg	cctcccaaag	tgctgggatt
67381	acaggcgtga	gccaccgtgc	ccagcctatc	tatctattta	tttatttatt	tttgagatgg
67441	agttttgctc	ttgttgccca	ggctagaatg	caatgggtgct	atctcgactc	accgcaacct
67501	ccacctcccc	ggttaaagcg	atttctcctgc	ctcaggctcc	tgagtagctg	ggattatagg
67561	catgtgccac	cacgcctggc	taattttttg	tatttttagt	agagatgggg	tttctccatg
67621	ttggtcaggc	tggctcctaaa	ctcctgacct	cagatgatcc	acccacctgg	gcctcccaa
67681	gtgctgggat	tataggcgtg	agccatcata	ccaggctcta	ttgatttatt	tttattttta
67741	tttttgagac	ggagtctcgc	tctgttgctc	aggctggagt	gcagtggcac	aatcttggct
67801	cattataact	tccgcccccc	cccagggtca	agccattctc	ctgcctcagc	ctcccagaca
67861	gttgggacta	caggcgcgtg	caacctatgc	tggctaattt	ttgtattttt	agtagagacg
67921	gggtttcact	gtgttggtcca	ggctgggtctc	gaactcctga	ctttgtgatc	tgctgcctc
67981	agcctcccaa	agtgcctggga	ttacaagtgt	aagccaccac	gcccagccta	ttttgtttat
68041	tttttcaaag	acccttgaca	cccaggctgg	agtgtagtgg	cactgtcata	actcactgca
68101	acctccgtct	cccagggtca	agcgattctt	gcacctcagc	ctccctagta	gctaggagta
68161	caagtacgtc	ccaccacacc	tggctaattt	attttttatt	ttgtagagat	gggtctcac
68221	tttggttccc	aggctggtct	aaacttctgg	tttcaagcaa	ccttcccacc	tcaaagtgtc
68281	gggagtacag	gcatgagcca	ccaccacacc	tggcctaatt	tgctgatttt	tatttatttt
68341	ttattattta	tcttaatttt	tattttgaga	cagagtcttg	ctctgtcatc	caggctggag
68401	tacggtggtg	caatctcagc	tcactgcaac	ctccccctct	cgggttcaag	cMattcttgt
68461	gcctcaacct	ccaagtagc	tgggattata	ggtgctggcc	accacgcctg	actaattatt
68521	gtaatttttt	tttttttttag	tagagacggg	atttcacat	gttggccagg	ctggtcttga
68581	actcctgacc	tcaagtgatc	cacctgcctc	agcctctcaa	agtatgggga	ttacgggtgt
68641	gagccgcctg	gcctggccca	atttttgtat	tttcagtggg	gatgggggtt	tgccatgttg
68701	gccaggctgg	tctggaactc	ctgacctcag	gtgacctcgc	tgccctccgc	tctcaaagtg
68761	ctgggattac	aggcataagc	cacctgcctc	ggccacacag	ggctccttaa	aaatgaagga
68821	ggatggcaga	agaaagttag	aggagatgt	gagtaaagaa	aaaagacaca	gagagctgca
68881	atgtttcttg	tttgaagatg	gaggaagggg	attgtgagct	aataaatacg	ggtggcctct
68941	aaaggcaaga	aagggtaaag	aactggattc	tcactctaga	gtcacccggg	aggaactatc
69001	aacatcttga	tttcagccca	gtgagactct	gtcagacttc	taagctacag	aactgtaaga
69061	taaatttgtg	ttgtttttaca	tcattaaatg	tgcagtaact	tggttacagca	gcaattagaa
69121	atgaatacag	aggactgggc	attaggcctg	tatctcagct	ttctctgatc	tcctgggtgtg
69181	ttcctgttat	ttattgttgg	tttccccag	aatgagtgat	ctaagaggaa	gcaaaataga
69241	agccgcaatc	tctttatgac	ttagcctcag	aagacacaca	ctggggccag	gtgcagtggc
69301	ttatgcctat	aatccagaca	ctttgggagg	ctgaggcagg	aggaccactt	gagcccagga
69361	gtttgagaca	ccctggacaa	cacaggggaga	ccctcactct	ataaaaaata	aacaaaatta
69421	gccagggtgtg	gtggtgcaca	cctgtagtcc	cagaactttg	ggaggctgag	acaagacaat
69481	gacttgagcc	caggagtttg	agacaggctc	ggacaacgtg	gtaagactct	gtctttataa
69541	acatttttaa	aattaggcgg	ggcatggtgg	ctcatgcctg	taatcccagc	aatttgggag
69601	gctgagggtg	gtggatcacc	tgaggctcagg	agttaaagac	aagcttggcc	aacatggcga
69661	aaccYcgtct	ctactaaaaa	Yacaaaaatt	agccgggcat	ggtgggtgggt	gcctgtaatc
69721	ccagctactc	aggaggctga	ggcaggagaa	tcatttgaac	ccgggagggtg	gaagtgttag
69781	tgagccgaga	ttgccttcct	cactccaaga	gttataaaag	attttgacca	tattttcttc
69841	tagcatttaa	tcaatttaatt	aattaatgtg	agacagtccc	actctgctgc	ccaggctgaa
69901	atgcagtgggt	gcaatctcgg	ctcactgcaa	cctctgcctc	ccggattcaa	gtgattctcc
69961	tgcccttagcc	tcctgagtag	ctgtgattac	aggcaccagc	cactatgcgt	ggctgatttt
70021	tgtgttttta	gtagagacgg	ggtttcacca	tattggccag	gctgggtctca	aactcctgac
70081	ctcatgatcc	Rccctccttg	gcttcctaaa	gtgctgggat	tacaggcgtg	agccactgtg
70141	cctggccttt	ttctttcttt	tttttttttt	ttcattagag	atgagttgtt	gttatgttgc
70201	ctctaactcc	tgggctcaag	cagttctccc	acctggcctt	cccaaagtgc	tgctgggatt
70261	acaggagtga	gccactgccc	ccagcctctg	acagtttttg	tgcactagga	atttgggaag

70321	acaatttttac	ctggctat	ctggctcata	caattgcagt	cagatggtgg	ctaaagctgg
70381	aacaataagc	agctaaaaca	gctgaaagat	aacctagcat	tctctctccc	tttctctgag
70441	tagtctccga	acctatctat	gttgtcctct	gcatgggcta	gcttgggctt	cctcacagca
70501	tggcagcctt	aaggctttaa	tagtcagctt	ccaaaatggt	cctcagtgat	tcctgcttcc
70561	tggatattgat	accattgtga	agtctcttct	cacattgaaa	ggggctgaac	tggcccattg
70621	ggataatgca	gaaatgacag	tgtgtgactt	tagaggctaa	atcatgaaga	tattgtggct
70681	tccatcttgc	tcctttgtag	atcactcatt	ctagacaaag	ccagctacca	tgatatgaaa
70741	gcactcaagt	aaccctaggg	agagaggtct	ccttagtgag	gaactgaggc	cctgtaagaa
70801	acgtgggtgt	gctgcagtca	agtgggcata	ggccaaagta	aacatccaga	gtgactcagt
70861	gagtttagag	tgcaggcata	tagctccact	tgttatcaca	gccgtgtagc	cataacatgg
70921	gaaggctcat	cacttggctc	tgagccactg	ttgtctgtaa	aaggtataat	tgccctgctg
70981	acactgtgca	cagggtcgg	cccaacatgg	cttgacatgg	gacatggctc	ttgtgcaggt
71041	gcttgtaccc	agagaaagag	agaaagccag	agctgtccat	ctcggggaag	ccaagacaca
71101	gctcagctag	ctcatgccca	gagggagaaa	gagtaaggct	gtggggtgtg	gtggctcatg
71161	cccataatcc	cagcactttg	ggaggccaag	gcaggtggat	cacaaggtta	ggagtttgag
71221	accagcctgg	tcaacatggg	gaaacccctt	ctcaactaaa	aatacaaaaa	ttagctggcc
71281	atgggtggtgc	atgcctgtaa	tcccagctac	tcaggaggct	gaggcaggag	aattgcttga
71341	accaggagg	cagaggttgc	agtgcgcca	gatcacacca	ctgcactcca	gcctgggcaa
71401	cagcgcgaga	ctccatctca	ggaaaaaaag	aaaaaagaaa	agaaaagaaa	gagtgaagct
71461	gctgaccctg	aagggtgagc	tggccacaca	gctgtgtgtg	tgtgggagct	gccggagtaa
71521	gcagctgaga	cagagcagac	agtgcgagag	taagatgttg	atgatgagag	agctgctgaa
71581	taaagccatg	tctcatctac	ctgctgtctc	tcgagtgttc	ttctagctcc	ctgcctcacg
71641	tccactgctt	cctctcacac	ctcagctggg	gctggacccc	aaccctgagc	atgacgggcc
71701	ttctgtcaac	aaccagcagt	aacctgctgg	gcatgtgagg	gagctacctt	ggaatcagat
71761	tctgtaaaac	agtcacgcct	tcagatgacg	gtagcatttg	ccaacatttt	gactgcactt
71821	catgagagac	cctgagccag	aaccccttag	attcctaacc	caaggaaact	gtgtgtgata
71881	agtgtttatt	gttttttttt	tttttttttt	tttttgagaa	agagtctcgc	tctattgccc
71941	aggctggagc	acagtggcac	aatcttggct	cactgcaagc	tccgcctctc	aggttcacac
72001	cattctcctg	aatcagcctc	ctgagtagct	gggactacag	gcaccaccca	ccacgcctag
72061	ttaatttttt	tgtattttca	gtagagacag	ggtttcaccg	tgtagccag	gatggtctca
72121	atctcctgac	ctcgtgatcc	gcccgcctcc	gcctcccaaa	atgctgggat	tacaggcgtg
72181	agtcaccaca	cccggccagt	gtttattgtt	ttaagatatt	ggctaggcgc	agtggttcac
72241	acctgtaatc	ccagcacttt	ggaaggccga	agtgggagga	tcacttgagc	tcaggagtcc
72301	aagttcaaga	acagcctggg	caacatagtg	agacctgtgc	tctattttaa	aaaatgtttt
72361	taagatgtta	tgtttgagct	gggtatggtg	tggctcacgc	ctgtaatccc	agcacttttg
72421	gaggctgagg	tgggtggatc	acctgtggtc	aggagatgga	gaccagcctg	gccaacatag
72481	tgaaaccccg	tctctactaa	aaatacaaaa	aattagctgg	gcatgggtgg	gggcgcctgt
72541	aatcccagct	actagggagg	ctgaggcagg	agaatcgctt	gaacccggga	ggcagaggtt
72601	gcagtgagcc	aagatcgtgc	cattgcactc	cagcatgggtg	ctatgttttg	gaggtaattt
72661	gttacacagc	aataaataat	tcgtacaggg	caccagcctg	gccaacatgg	agaaaccctt
72721	ctctagtaaa	aattatccgg	gtatgggtgg	gcatgcctgt	aatcccagct	acttgggagg
72781	ctgaagcagg	agaatccctt	gaacctggga	ggtggaggct	gcagtgagcc	aagatcgcac
72841	cactgcactc	cagcctgggt	cacagagcaa	gactctgtct	caatttaaaa	ataaaataat
72901	aataatatag	ggcagtcaga	ctgcccacct	ggcagctcag	gactagcaca	tgtgctccag
72961	aaagccagg	ggaagctaca	tatttttatga	tctaaactca	gaagtcatat	agcatctgtt
73021	ccactgtaat	cacaagcctt	cccagttcca	aggggagggga	acatagactc	cctcacctct
73081	tgatacaaga	agtgtcaaa	ttatatggta	agaagtgggc	caggccctgc	ttgtctctgt
73141	tgttcatgcc	tgtaatccca	gcactttggg	aagacgaggc	agatggatca	cctgaggtca
73201	ggagtttgaa	gccagcctgg	ccaacatggg	gaaacccctat	ctctacaaaa	atacaaaaat
73261	tagctgggca	tgggtggtag	cacctgtaat	cccagctact	tgggaggcca	aggcacgaga
73321	attgcttgaa	gctgggaggc	agaagtgtga	gtgagccgag	attgtgccac	tacactctgg
73381	cctgggttac	agtgcagagc	tctgtctcaa	aaaaaaaaaa	aaaaaaaaag	agagaagttg
73441	gttgggcccc	gtggctcacg	cctgtaatcc	caacactttg	ggaagctgag	atgggaggat
73501	cgcttcaggc	cagaagatcc	atcgttacca	gcctgagcaa	cacaaggaga	tcccgtcctt
73561	acaaaatttt	tttaaaaatc	agctgggtgt	ggtggcaggc	acctgtggtc	acagctactc
73621	gggatgctga	ggtaggagga	tcgcttgagt	cagggtgggt	gtggctgccg	taagccatga
73681	acatgccatt	gcattctagc	ctgggttaaca	gagtgcagaca	ctgtttcaga	aaaaataata
73741	aaataaaaata	aataatgttg	taggacaggc	gtggggctca	cgcttggaat	ttcagtgcct
73801	tgggagactg	aggcaggagg	attgcttgag	aacaggagtt	cgaggctgca	gtgagctgtg
73861	atcgcaccac	tgcactccag	ccttggtgac	atgagcgata	tcttgtctca	ataaataaat
73921	acatacagtt	ctctttttaca	tcgagtataat	gtaaattttt	aaaaatacat	tgaaagcgct
73981	tagaaagccg	cctgactctc	cctctccctc	tccctctccc	tctccctctc	cgtctccgct
74041	tccgtctccg	tctccgtctc	cgtctccgct	tccctccacg	gtctccctcc	acggctctcc
74101	tctgatgccg	agccaaggct	ggacgggtgt	gctgccatct	cggctcactg	cagcctccct
74161	gcctgattct	cctgcctcag	cctgctgagt	gcctgcgatt	gcaggcgcac	gcgcgccacg
74221	ctcactgggt	ttcgtttttt	tttttgggtg	agacgggggt	ttgctgtgtt	ggccgggctg
74281	gtctccagct	cctagccgcg	agtgatccgc	cagcctcggc	ctcccggggg	gccgggattg
74341	cggacggagt	ctcgttcact	cagtgcctctg	tggtgcccag	gctggagtgc	agtggcgtga
74401	tctcggctcg	ctacagcctc	cacctcccag	ccgcctgcct	tggcccccca	aagtgcgcag
74461	attgcagcct	ctgcccagcc	gccaccccg	ctgggaagtg	aggagcgtct	ctgcttggcc
74521	acccatcgtc	tgggatatga	ggagcctctc	tgcctggctg	cccagtcctg	aaagtgagga


```

74581 gcgtctctgc ccggccgcca tcccatctag gaagcgagga gcgcctcttc cccgccRcct
74641 tcccatctag gaagtgagga gcgtctctgc ccggccgccc atcgtctgag atgtggggag
74701 cacctctgcc ccgcgcgcct gtctgggatg tgaggagcgc ctctgctggc cgcaaccctR
74761 tctgggaggt gaggagcgtc tctgcccggc cgccccgtct gagaagttag gaaaccctct
74821 gcctggcaac cgccccgtct gagaagttag gagccccctc gtccggcagc caccctctct
74881 gggaagttag gagcgtctcc gcccggcagc caccctctcc gggaggagg tgggggggggt
74941 cagccccccg cccggccagc cgccccatcc gggaggtag gggctcctct gcccgccgc
75001 ccctactggg aagtgaggag cccctctgcc tggccagtcg cccgtccag gagggaggtg
75061 ggggggtcag cccccgccc ggccagccgc ccagtccggg aggtgagggg cgcctctgcc
75121 cggccgcccc tactgggaag tgaggagccc ctctgcccgg ccagccgcc cgtccgggag
75181 gggggagggg gggtcagccc cctgcccggc cagccgcccc gtccgggagg gaggtggtgg
75241 gggtcagccc cccgcccggc cagccgcccc gtccgggagg tgagggtgct ctctgcccgg
75301 ccgccccctac tgggaagtga ggagccccctc tgcccggcca gccgccccgt ccgggaggga
75361 ggtggggggg tcagcccccc gcccgccggg ccgccccgtc cgggaggtag ggggcgcctc
75421 tgccccgccc cccctactgg gaagtgagga cccctctgcc cagccagccg cccgtccgg
75481 gagggaggtg ggggggtcag cccccgccc ggccagccgc ccagtccggg agggaggtgg
75541 ggggatcagc cccccgccc gccagccgcc cagtccggga gggaggtggg gggatcagcc
75601 ccccgccctg ccagccgcc cgtccgggag gtgaggggag cctctgccc gccgccccct
75661 ctgggaagtg aggagcccc ctgcccggcc agccgccccg tccgggaggg aggtgggggg
75721 gtcagcccc cgcccgcca gccgccccgt ccgggaggga agtggggggg gtcagcccc
75781 cgcccgacca gccgccccgt ccgggaggga ggtgggggga tcagcccccc gcctggccag
75841 ccgccccgtc cgggaggtag ggggcgcctc tgcccggccg cccctactgg gaagtgagga
75901 gccctctctg cctgcttgaa ggcagcatgc tcgttaagag tcatcaccac tccctaattc
75961 taagtacca gggacacaaa cactgcggaa ggccgcaggg tcctctgcct agggaaacca
76021 gagacctttg ttactttgtt tatctgctga ccttccctcc actattgtcc tatgacctg
76081 ccaaatcccc ctctgcgaga aacaccacaag aatgatcaat aaaaaataaa aataaaaaaa
76141 aaaaaataaa aaaataaaaa aaaaaaaaaa gaaagccgcc tgacctgtat acagtattct
76201 gaaaaggggg tcgcgaggtg catgtccaac ctccgcccgc gggggcagca gcgagtccag
76261 gccgagccgg ggccatagca gcgggggtcaa atgggggtgag gcctgtgcca gacctctcca
76321 cctcggtggc agccgcagcc tccctccgct gcggctcctg tccacgcccg ggccacgtga
76381 gcgccagatt ctgggcgaca gaccactgcc agtcctttgc tgctttgcgc agcctgtcct
76441 ccccgccagg agcacccttc ccgctccctt ttaccacggg ctccagccgt ggctgccttg
76501 gggctgccgc cgcctggctg taYtccagga cgttgggaaa gaacgggtgg gaatgggtg
76561 ggtgggggtc aaagaggaaa ccagagatg cagggcgcc ctttcccgtg gtctgcccc
76621 aattgctcag gcaggccagt cacggtgagg cgtcctccct ccaagtttat atttattatt
76681 atttattatt tttttttttt acctcaagt ttattatttt ttattatttt atttattttt
76741 gagacggagc ctctctctgt cgcccaggct ggagtgcatt ggcacgatct tggctcactg
76801 caacctccgc ctcccgggtt caagcgattc ttctgcctca gcctcccag tagcagggat
76861 tacagggtga tgccaccaca tccggctaatt ttttgtattt ttagtaaaga cagagtttca
76921 ccataattggc caggctgggtc tcgaactcct gacctcaggt catctgccc ccttggcctc
76981 ccaaagtgtc gggattacaa gcatgagcca ctgcacctgg ctaacctcca agtttaaaga
77041 cagccgccag gccagtggtc tcaactcctgt aaccccaaca actcaggagg ctgaggccag
77101 gaatttgaga ccagcctggg caacatagcg agaccccggc tctaagaaaa ataggccagg
77161 cacggtgggt tacgtctgta atcccagcac tttgggaggc tgtggcaaaa ggattgcctg
77221 agggggaaaa aatcacctct ggggtagtgg tgcacactta cagtctcggc tacttgagag
77281 gctgaggtgg gaggatcatt taagtccgag gctgcagtga gctactatgg agcgactgta
77341 ttacagcttg agcaacagag cgagacccca tctccaata aataaataaa gatagcctcc
77401 aaagatgtca cttgcttcac ttagcacttt ttattgaaca tatttaggaa atatataacc
77461 atggtaaaga aaattgcaat tagtacaat acacactaca cacatatgca cgtgcacaca
77521 ctgaaacgtg tcccttccag cgctcctgct ctggataatt tttttttttt ttgcaacgga
77581 gttttgctct tggtgcccag gatggagagc agtggcggga tatcggtcca ctgcaacctc
77641 ctccctcccg gttcgagcga ttctcctgcc tcagcctcgc gagtagctgg gattacaggc
77701 gccagccaca acaccggct gatttttgta tttttagtag agacggggtt ttgccaagtt
77761 ggccaggctg gtctggaact cctgagatcc gccacctcg tccctctcaa gtgctgggat
77821 tacaggcctg agccactgog cctggcctaa agtaattgtc ttcttattgg tttctctgcc
77881 tttggtctca ccaaacgccc cactctaaat cactgcagac aaggggttct gtctaaggag
77941 gagagcccac cagttaaaac ccttcagtag ttccctaact ccctaggaca aatgcagact
78001 tatccttcgc tctctgctgc cgccccctct cttcccagat cccatatggc tccagccata
78061 tcctcagacc atctgggctg ttgtctgtcc tgccacacac ccttcccacc ccgctccctt
78121 gcaagtccca ctcaggctgc acctacacag ctgtctcagt ttctatctga ggctcccga
78181 gcctcctctg aaagtccca tcacagccaa tgatactgaa actgttttct tatgcagggc
78241 acggaaagat ctattcaact cactgoccaa tctcctctcc tgggtgcagaa aagacacca
78301 gtcagcgact tgcattatct gcaggcatga gtgaataata ataattgcct acccttatat
78361 agtgctaatt ccacgcctgg cactgttcta ggcactcata taaattcatg taatccacac
78421 aacccccaaa ctgatgatct ctcttcatct tacciaagcac tgagcagtta aataacttgc
78481 tccagatatt aaggggtcga gctgggggtt gaagcctggg tgagcagtta taccataaaa tgaaccaaga
78541 actggaagga ggacaagaSc tccgagaagg agtcaggtag ggcgtgatct gtgcgcttta
78601 catctaagat cttccagctc ccagggagcc cgtttcatag agcaggagat agaggctggg
78661 agggacacgg agagcctcga gagcgtgtg gaggaagcgg tgctgtttgg ggtccgggag
78721 caagggcgtg gcctggatgc gcgggcgccc gggacggcac gtcctcagac caaactacaa
78781 ctcccaggac ccagcgggag ctgcccgcga cgcgacgtca cggcggcgga gggcgcaggc

```

78841 ggctggggcgc ctggcgagtg gactgttcga gcccttcgcg tgggacccgg gccctggctc
 78901 cggcccccgcg gtaagtgggg cgaccccagc ctactcagtc cgcggaggcc ccgcggcgca
 78961 cgtccgcagc ctccatcaca gcgcggggcg gcagacgggg ctggcatcta ccatatgggg
 79021 ggcacccggg ccgaaccaag tgacccgcgt ggggggtccc gctggggact ccgtgccgca
 79081 ccctcccaag ccggcccccag gggcccaggg ctggtgtcgc acgttcgctg gccgcgctcc
 79141 cagggcccg gtttgaaggc gctgggcagg caggggcagc cccgccccct gagaagggtg
 79201 cccgggaccc cggggcgctg gggcgaggtt ttcgggctgg aagggtctga ggggctcctc
 79261 ccccgacagc cctcccaccg ccagtagagc ctcggttgg ggaatagaag cccccgggag
 79321 gctaggtcct ttggggcgcg cctgtgtgca tctggggaga cgggtgggag ggtggggaga
 79381 ggtcgcccg gtctggggag accgatgcac aggtggagag atggtgcggg ttctgtggat
 79441 tcggatcctt acaacttcct cttccccgcc ccggtagatg ggagctgctc tccgcgggct
 79501 gagcctgtca gcatcctcga cgcaccctgg tccctgaagt cggagaagMg cccctacca
 79561 cccacacccc cttgccccat tttgggtcgc ctgggtcctc agtcctagcg gatcctcagt
 79621 cctagcggcc accgggtctg aaaggagcaa gacgatgatc ctggcgctcg tgctgaggag
 79681 cgggtcccgg ggcgggcttc cgctccggcc cctcctggga cccgcactcg cgctccgggc
 79741 ccgctcgacg tcggccaccg acacacacca cgtggagatg gctcgggagc gctccaagac
 79801 cgtcacctcc ttttacaacc agtcggccat cgacgcggca gcggagaagg tgcgcaaggg
 79861 ggcagccagc ccagggtccg gRatgtaggc gggagggaga gtgttggggg ttctctgctc
 79921 aaggcctctc tccctctcta gccctcagtc cgcctaacgc ccaccatgat gctctacgct
 79981 ggccgctctc aggacggcag ccaccttctg gtaagattca cgcctctat tttcctcgtg
 80041 gatcctggag ctctcccaga cactcaggct ccagccccgc cttcccttct cattttctcc
 80101 cagaaaagtg ctcggtacct gcagcaagaa cttccagtga ggattgctca ccgcatcaag
 80161 ggcttccgct gccttccctt catcattggc tgcaacccca ccatactgca cgtggtaagg
 80221 tagagaggac cttaggtcag cgggccaccc tgccccgggg gcaagtgggg agtctggggc
 80281 ccagagtggc agacgattgc ttgcctaaag gtgtcagggc cacacaggat tcaaccccag
 80341 gccttcagaa gccaaagggt tgtattcacg gagcctggaa gggtcgaagt ggggggttga
 80401 tcacgtggtc gaccagctgg gtggtgatcc ccatgggtag gtgggggtgg ctgttctctg
 80461 ctcagtgcc atgcggcttt gtgaattccc acacctcttc cttgcagcat gagctatata
 80521 tccgtgcctt ccagaagctg acagacttcc ctccggtgag tgctgggcca gagcagggtg
 80581 aggggctgag aggttgggct tggaccaccc ttcctcatga ctctgtgacc tgcagatcaa
 80641 ggaccaggcg gacgaggccc agtactgcca gctggtgcga cagctgctgg atgaccacaa
 80701 ggatgtgggt accctcttgg cagagggcct acgtgagagc cggaagcaca tagagggttg
 80761 ggcagcaaag gagaggccgg gcctgctggg ggtgggaagg gcacgggatt ctgagacctc
 80821 actctttaca ggatgaaaag ctcgctccgt acttcttggg caagacgctg acttcgaggc
 80881 ttggaatccg catgttggcc acgcatcacc tggcgctgca tgaggacaag gtggggctct
 80941 gggacctgag acccacctgg gaacattaag tgagacagag gagactgggc tggggatccg
 81001 ggtcaagggc ctgggggctg aggtgtggtg gctggtgctt tggggcagtt ccgaagttgc
 81061 cagcatcttg ggggtgggct aggggcgtgg gtagtcctga cctccttctt ccggccagcc
 81121 tgactttgtc ggcatcatct gtactcgtct ctcaccaaag aagattattg agaagtgggt
 81181 ggactttgcc aggtgaggca agaattggct aggggggtgg cagacatctg gggcaggga
 81241 ggcttgggtc tgagcccttg cccggggcat gatctgcggg gagcagggtt totcaaccat
 81301 ggcactattg acatttccag ccagataatt ctttgtcaYa ggggctgccc cgtgcacgtt
 81361 aggaagtcca gcagcatccc tggcgccagc agtactgcct agttgtgaca aacaaaaatg
 81421 tctctgcaca ttgccatatg ttacttaggg gggcagaatt gtttccagtt gcaaaccact
 81481 ggtggagggg cccctgactg aaccctcgt cctatccgca gacgcctgtg tgagcacaag
 81541 tatggcaatg cgccccgtgt ccgcatcaat ggccatgtgg ctgcccgggt ccccttcac
 81601 cctatgccac tggactacat cctgcccggg ctgctcaaga atgccatgag gtgggggtgg
 81661 ttgatgtgct ggcttggggg Yggacaggaa ccgggNtgct tgtacctact ggtctttccc
 81721 ctctgcatag agccacaatg gagagtcacc tagacactcc ctacaatgtc ccagatgtgg
 81781 tcatcaccat cgccaacaat gatgtcgatc tgatcatcag gtttgcctg agtgggagtt
 81841 gagctgaggt ggatgggatg ggggtctagg cactgtttct gacttgattt aggacctga
 81901 gccccttcct gcccattctt gggacttggg ccctgaccag acaaactatt ctctgaatcc
 81961 tgagatggcc atgagctgct tattaatgga tctggggcca gctgcaggcc taggtatcct
 82021 gcctctgtca gcagctgagg agcttgaat tgagaaatag tcaggagtgc gtctaggatg
 82081 ctgggcccag gataaatgtc acatcctgtg agaaggata agcagtcagt ggccctggca
 82141 ggggtgagga tgatataaac aaggcccaag ggtctagggt gaccacattc cagctctggg
 82201 tggaaggaa caagagggc actttgcact gtctgcttgg ggggtgggtg gtaccccatc
 82261 aaagctgagc caagcccatt gttgttgcca tcttgctagg atctcagacc gtggtggagg
 82321 aatcgctcac aaagatctgg accgggtcat ggactaccac ttcactactg ctgaggccag
 82381 cacacaggac ccccgatca gccccctct tggccatctg gacatgcata gtggcgccca
 82441 gtcaggaccc atgcacgggt gagaccctgc caggccagga tggaggggtg ggggacccca
 82501 ggagactcaa gcctctgaag cctcctgtcc tgtcccctg cccaccccca gctttggctt
 82561 cgggttgccc acgtcacggg cctacgcgga gtacctcggt gggctctctg agctgcagtc
 82621 cctgcagggc attggcacgg acgtctacct gcggctccgc cacatcgatg gccgggagga
 82681 aagcttccgg atctgacccc acagcctttg gcctgctcac ccgaccagcc tgggcccgat
 82741 tccctgcagg acctcccggg tcaggcaggg cggccccctg ctcacacac tgctgcactc
 82801 tgggtctcag ggaccagac agatggactt acatggagct gggcactgcc ctgcctcaac
 82861 agggctcatt gcctcctcgc ctccagaact tggagcaggg aagtgggac cctgaggcct
 82921 ccagcaccag ttccgtcatt ctcgctcctg gggaaacccc actctgacct gttattaaag
 82981 ttcacatttt gaatgccctc tcgggccccg tgtgtgggga gggcagggtg acttttgttt
 83041 ctgcccccat tcaggttcac tgagcccttg ggttgaactg gttcgtgtcc cagtctctta

83101	cctgccctga	gagcctggca	ggccaggagt	agaatgggtc	ccaagtctgt	tgcattgttg
83161	atgtgggtgg	agtgggatga	ctgcagcacc	ttatacaaag	agctttcatt	catcttggtg
83221	aacaaatgtt	tccgggtccc	agataatatt	gaaggcccag	actgacccag	cttcgggcat
83281	cagttttgac	tcttcctttc	ctggcagtc	cagtttctag	aggtgaaggt	caccagactg
83341	ggcaaactcc	tgagccaact	gcttcccaag	cctgagtagg	ttaaaaatac	tgtgtctgct
83401	gctgccaaag	aaaagaacat	acaagggtgt	gccttggcag	gccctagcag	ggactgggtg
83461	ccccactgca	aggaaaggtg	gggcccctgat	agaaaggacc	aaggatttgg	gcaaagRtat
83521	caggtaggct	caaggttaga	cctgaatcag	aactccagat	gacatcttag	gtaggaacac
83581	cctaccacc	ttgccaggga	agaaaggcct	aagggcggcc	tggtggggct	gggaggagaa
83641	ctggaaagtt	ctcttgccct	cacatgtgag	ctcccacagc	aaacttctct	aggctggctc
83701	taggcctgta	ccatctccta	cccttcacgg	ggatggaggg	gaagttgtat	gtggaagcca
83761	aatggcaggg	gctaggaaac	cacagtgact	tgctagactg	aaaaatcccg	ccagctgcaa
83821	ggcaggggtg	tgaggctgga	gaggcaggca	gcagtacag	gccagggccc	tgaaacatgg
83881	gatttatctt	gagccatagg	gatccatggg	tgagttttta	tttatttaga	aatggggctc
83941	tgctctgttg	cccaggctgg	aatatgggtg	ctgcagagtt	cactgcagcc	ttgaactcct
84001	gggatcaaga	gattctccca	cctcagcctt	ctgagtagct	tggaacctca	tgccaggcta
84061	aatttttaaaa	ttttttgtag	aaacagggtt	tctacaaagc	cctatgtttg	cccgggctgg
84121	acttgaactt	ctgggctcaa	atgatccctc	caccccagcc	tcccaaagtg	gtgggggttac
84181	aggcatgagc	cactgcagct	ggcccatgag	tgggtttttg	gctgggaagg	gatgtttctg
84241	gttgaggtcc	ctgagaggat	tcatgtccac	gtgatttctt	aagaaagtgc	tcccagaaca
84301	gagtagggga	agtaggaagg	ggaaggggag	gaagccaagc	aaggatgtga	cctcaggcaa
84361	aagcccagaa	ccagtcaatt	atgcctcagg	gttgaaggta	agagagctaa	acctcagagt
84421	tactgattaa	tttctccact	tggcagtcac	tgggttaaagt	cagttgggaa	agtgaacagc
84481	tctattaacc	taaggatggg	tttttaagaa	gagcctcagg	tgctgggtgtg	ggtctttgaa
84541	agcacatcaa	aggtaatctg	ggcacacaga	aacagcaaga	actcccagag	gatctgggtg
84601	gagcacctac	attgtttttt	tgtttgtttt	gtttcgtttt	gtttttttta	acggagtctc
84661	aatctgttgc	tcaggctgga	gtgcagtggc	tggatcttcg	ctcactgcaa	cctccgcccc
84721	accccccccc	aaccccagg	tcaagcgatt	ctcctgcctc	agcctcccga	gtagctggga
84781	ttacaggcgc	gtgccaccac	acccagctaa	tttttctatt	tttagtagag	atgggggttc
84841	accacgttgg	ccaggctggg	ctcgaactcc	caacctcgtg	atccatccac	ctcagcctcc
84901	caaagtgcc	ggattacagg	catgagccac	catgcctgtc	ggatgtttct	tgatttgtaa
84961	cctctgagag	acccatccgc	aggccctgag	cattccactc	ctctcagaat	tgtttccaag
85021	cccaataacc	acattataaa	tcaaacaaga	ttcagagaat	agccaaagg	aatgtttact
85081	gagtacctac	ccggtctggc	actttgcaat	acacttgtat	attgctaaga	cggatagtcc
85141	aaccgttaca	tagttatatg	attgatagtt	atacatgctt	aactgctggg	gattgggtcc
85201	aggaccgcct	gtgaataacc	aaatctgcag	gcgtcaagt	cctacagttg	gccctgcca
85261	acagcagata	tgaagtcagc	tcttcagatc	tgtgggttct	gcacccctac	aatatttctc
85321	ttcctttcct	tttcttttcc	tcccttcctc	cctctttttt	ctttttcttt	tttgagatgg
85381	agtcttgttg	tgtcggccag	gttgaggtgc	agtggcgcga	tctcggctca	Mtgcaacctc
85441	cacctcctgg	gttcaagcag	ttctcctgcc	tcagcctccc	aagtagctgg	gattacaggc
85501	acacgccacc	acccctgact	gttttgtatt	ttcagtagag	acgggggttc	acaatgtggg
85561	ccaagctggg	tttgaactcc	tgacctcaag	taatccacct	gcttcggcct	cccaaagtgc
85621	tgggattaca	ggtgtgagcc	accgcgcccc	gtcttttttt	tttttttttt	gaggcagagt
85681	ttcactcttg	ttgcccaggc	tggagtgcaa	tggcacaatc	tcagctcacc	acaacctctg
85741	cctcccagg	tcaagcgggt	ctcctgcctc	agcctcccga	gtagctggga	ttacaggcat
85801	gcggccacca	cgcctggcta	atthttgtatt	tttagtagag	atgggggttc	tccatgttgg
85861	tcaggctggg	ctcgaactcc	cgacctcagg	tgatctgcct	gcctcggcct	cccaaagtgg
85921	tgggattaca	ggagtgagcc	actgcgcccc	gcctcctttt	ctttcccccc	tttttttttg
85981	agacagggtc	tctgtcacc	aagctggagt	gcagtggagg	gattatagct	cactcagcct
86041	cgacctcctg	ggttttaagc	atccctctgc	ctcagcctcc	tgagttaggtg	ggactacagg
86101	tgcgggcccc	gaggcccagc	taattttttt	tttcccccaa	atthtttagta	gaaaggaggt
86161	ctctatgctg	cccaggctgg	tcttgaactc	ctggcctgaa	gcgatcctcc	tgcttggtat
86221	cctgaagtgc	gagattacag	gtgtgagcca	ccatacctca	acactgtatt	ttcaaccgcg
86281	tcttcgttca	atctccaaag	gtgggacatg	cggatatgga	gggcccattg	tRtatgggtg
86341	gaccatacac	atataaatgg	ctttaacctt	tactgactct	cacagaacct	tcagtgcagt
86401	ggcgtgatct	cagctcactg	caagctccac	ctcccgggtt	cacaccattc	tctgcctca
86461	gcctcccag	tagctgggac	tacaggggac	cgccaccacg	cccggcta	tgthttgtat
86521	tttttttttag	tagagacgga	gtttcatcgt	gttagccaga	atagtctcga	tcttctgacc
86581	tcgtgatcca	ccgcctagg	cctcccaaag	tgctgggatt	acaggcgtga	accaccgcac
86641	ccggcctttt	tatttttttt	gagatggagt	ctggctcttg	gtcccaggc	tggagtgc
86701	tggcggggtc	tcggctcact	gcaacctccg	cctcccgggt	tcaagcgatt	ctcctgcctc
86761	agcctcccga	gtagctggga	ctacagggtg	gtgccaccac	gcccggctaa	atthttgtatt
86821	tttagtagag	acggagtthc	acgggtgttag	ccaggatggg	ctcgatctcc	gcccgcctcg
86881	gcctctcaaa	gtgctgagat	tacaggcgtg	agccaccacg	ccccgcccc	ctcgtccttt
86941	cttttagactt	tatcctgtga	gggtgaatta	tggcctgtcc	ctggacacac	ccgttctgct
87001	ttccccgcac	caactgtatc	ccaaatagg	gaagtgtct	cttcaacctt	caaaaatggg
87061	gcaactggctg	ggcacgggtg	ctcacgcctg	taaccttagc	actttgggag	gccgaggcgg
87121	gcggatcacc	tgaggtcagg	agttcgagac	cagcctggcc	aacagggtga	agccctctct
87181	ctactaaaaa	tacaaaaaat	agccggggcgt	ggtggcgcgc	gattgtaatc	ccagctatcc
87241	aggaggctga	ggcaggagaa	tcgcttgaac	ccgggaggcg	gaggctgcag	tgagccgaga
87301	tcgcgtcact	gcactccagc	ctgggcgaca	gagcgagact	ccatctcaaa	aaaaaaaRag

87361	ggggggggggc	ggggagcgac	attaggccag	cgcgagtgtg	cggctccagg	ccaccagggc
87421	ggccgctctg	gctctgccct	gttaaagtgg	gggcagcgcc	cgctgaaaat	tggcacatct
87481	tggcttccgc	aggtaccagg	gcctttaaaa	aggttcagct	ggccggggcac	ggtggctcac
87541	gcctataatc	ccagcacttt	gggaggttga	ggctggcaga	tcacgaggtc	aagagatcaa
87601	gactatcctg	gacaacatgg	tgaaaccccc	tctctactaa	aaatacaaaa	attagatggg
87661	cgtgggtggcg	cgcgccctgca	gtcccagcta	cccgaggaggc	tgaggcagag	gaatcgcttg
87721	aaccYggagg	cggaggttgc	agttagccga	gatcgcgctt	ctgcactcca	gcctggggcga
87781	cagagcatga	ttccgtctca	aaataaataa	ataaataaat	aaataaataa	attaaaaaaa
87841	ggttgagttg	agtcatcgca	tgaggtaagt	ctgtctcctc	tcctcaccca	taggctgcag
87901	ccacaggtcc	gcacggaaaa	ccaggagctc	caagactgcc	gcacactcaa	catccaactc
87961	gcggggccgc	ggggacggcc	acagaagcca	atcggtcctt	gctacatcac	agaccccgcc
88021	ctcaaaccctt	gaggagcccg	ccccacgcac	tgctgacccg	gagccaaaag	aactgcgtgg
88081	cgtccgattc	tggcgctcact	tcccttcccc	cgatggcggc	acaggagagt	gctgcggcgg
88141	ttgcggcggg	gacttcaggg	gtcgcggggg	agggcgagcc	cggggccggg	gagaatgcgg
88201	ccgctgaggg	gaccgcccc	tccccgggcc	gcgtctctcc	gccgaccccg	gcgcgcggcg
88261	agccggaagt	cacgggtggag	atcggagaaa	cgtacctgtg	ccggcgaccg	gatagcacct
88321	ggcgtgaggg	cggggcccag	ggctgggggg	ggggcgagag	tcagggccag	ggggtggggc
88381	ggggccctgag	gacaggctgt	cagttagggc	aagatccggg	ggctgggagt	ggagaggagg
88441	aggggcgggg	cttgaggaaa	gaacgcgcgc	ttccggggcg	tgagaaacca	gccgggttgt
88501	gggaggctgt	tgaccttgaa	ttatgccgag	cgacgcctac	aaacccaccg	ctcaggcctt
88561	caccaggatt	gttcccatct	cacttccttg	cccagctctt	ggcttcattc	ctttttcttg
88621	ctaacgctgc	ttcctcaccc	tctcttgtct	ctgcgtcttc	tttttccatt	tgtccctggc
88681	agccatccgc	agagagaaga	ccttccagaa	acaacaggct	ttcctttcct	aaagtcttgc
88741	tgcccttctct	cattttcaaa	attaacccca	aactccttag	ggtggcattc	attttttgtga
88801	cctctccagt	ttctagccaa	cactaggaaa	gggcattgcc	aggccagaac	acactgtgcc
88861	ctctgaagac	cacacgccct	ttaccacctg	tgccctttgc	ttggaatgct	ttttcttccc
88921	tttctccttg	tttgccctgc	tagctcctac	tcctcctcct	agcttcatat	ccttttgtat
88981	gtcatccttg	attccccttc	aggcaaagtg	agtggttccc	ttctctatgt	tcctgcaaca
89041	tttttttccct	aYctcagtca	tagtttttgt	aacattatgt	tgtaattttc	tctctctgtc
89101	ttcctccatc	atactgggaa	ccttctggagg	gcagcacttc	ttgtgattca	tcactgtgtc
89161	ctctgtaccc	ggcaacaaca	cagcataggg	ccagacacgt	agtggttgcc	ttactcattt
89221	attgaatgct	ctgctaattg	tcagggtgcgc	tgctaaaaat	tttggaggca	ttaattcacc
89281	ttctaagggt	ggtactatta	tcccttttgt	cttttttttt	tttttttttt	ttgagacagg
89341	atctcgctct	gtcaccacag	tgggattgcc	gtggcacgat	gacagctcac	tgaagcctag
89401	accttctagg	ctcaagtgat	cctcccacct	caccctctca	gagtgttggg	attactggca
89461	tgagccactg	tgcccagctg	ttatcccttt	tcacagatga	agagactgag	gctcagaaag
89521	atggaataac	ttgctcagtt	acacatagct	aggaagtagg	gagctggaat	tttgtgtatt
89581	tttttttgttt	tgttttgtttg	agatgggaatc	gctctctgtt	gccaggctgg	agtgcagtgg
89641	cgccatcctg	gctcactgcg	atctctgcct	cccggattca	agcgattctc	ctgcctcaac
89701	ctcctgagta	gctgggacta	cagttgtgcg	ccaccacacc	cagctaattt	ttgtattttt
89761	agtagagacg	aagtttcacc	atgttggcca	ggatggtttt	gacctcttaa	cctcgtgatt
89821	caccacacct	ggcctcccaa	agtgtcggga	ttacaggcgt	gagccacgat	gcccagccct
89881	ggaattatac	attaatgtag	gttatcttaa	tccagagcca	gcactcatga	tcctgaaca
89941	aatgaacaac	tgcggggatg	tggtaaaaatg	agcattgaat	ttagagtccg	acttaaattc
90001	agttaagtat	tagctcttaY	cacttttcaa	atctgtgacc	ctaggtaagc	ctcagttttg
90061	ttctgttttt	tggggttctt	ttttttgaga	cagagtcttg	ctcttgtcac	ccaggccaca
90121	gtgcagtggg	acaatctcgg	ctcactgcaa	cctctgcctc	ccgggttcaa	gcaattctcc
90181	tgccctcagc	ttgcctccca	ggttcaagca	atcttctctg	ctcagcctcc	Ygagtgttg
90241	ggattacagg	tgtgtgccac	catgcctggc	tttttttttt	ttcRtctttt	tggtagagat
90301	gggggttttg	catgttgacc	aggctggctt	caaactcctg	gcctcaagtg	atctgcccct
90361	ctcgccctcc	agaagtactg	ggattacagg	tgtgagccac	acacccagcc	agttattttc
90421	tcattcgtaa	aatgagaata	acagccYcaa	cctgatccac	ctcacagtgg	tggcagtgat
90481	tgagtagaat	ggcagaggtg	gaccagttag	gttagctgat	gtgtggccct	gaactctgga
90541	aactgcttct	cagtgtgcag	gattcctttt	gttccagcct	taccttctg	atgaccctag
90601	Nctttttcca	tcacagattc	tgctgaagtg	atccagtctc	gagtgaacga	ccaggagggc
90661	cgagaggaat	tctatgtaca	ctacgtgggc	tgtgagtggc	ttggcacatc	tgggcgtggg
90721	tgcRgggagt	tggctgccct	ggcagcactc	ttatggccca	tacttacagt	taaccggcgg
90781	ctggacgagt	gggtagacaa	gaaccggctg	gcgctgacca	agacagtga	ggatgctgta
90841	cagaagaact	cagagaagta	cctgagcgag	ctcgagagc	agcctgagcg	caagatcact
90901	cgcaacccaa	agcgcaagca	tgatgagatc	aaccatgtgc	agaaggctcg	gatcccttcc
90961	catccacggg	cccaggaggc	ccagcttctc	tgccagttcc	cttgggtctc	tcgggcccc
91021	gtgccaaaac	catagcaaat	cccatttctt	aagctcctgt	agtgtgtcag	ggactttacc
91081	tacttctctt	tacttacttt	tcataggtaa	gaaaacagac	agagggtaag	ggcttcgctg
91141	cagtctcaca	gcaaggaaat	ggcacagctg	ggactagaac	tcaggcctcc	ggcactggta
91201	gcctcttttg	tctcctagta	gctgtgtctt	agtagaaaaa	atgacttgaa	gttcagtggg
91261	aaagacgaga	atgttatctg	gcagttgcta	tagccaagca	ccctgccaag	tgctgtatat
91321	gtataagctc	ctcaaaccct	tcccaacaat	tcaacacaca	ggaatagtta	cttttttggt
91381	aggtgaggaa	gcaggctgag	agagattaa	taacatgccc	aaggtcacac	agccagtaaa
91441	acgggtgggct	ggaattagaa	taataatgcc	aaacacttgt	tagccgggtga	gcagaagtat
91501	tcagctaaat	ggttttttgt	tgtgtgtgtg	tgtgtgtgtg	tgtgtgtttt	gttttttgtt
91561	ttttttttttg	agacggagtc	ttgctctgtc	gcccagggtg	gagtacagtg	gaatgatctc

```

91621 ggctcactgt aaactccgcc acctgggttc aagcaatfff cctgtctcag cctcccaagt
91681 agctaggact acaggtacct gccaccacgc ccggataatt tttgtatfff tagtagagac
91741 gaggtttcgc catattgggtc aggtctggtct cgaactcctg acctcaggtg atctgcccac
91801 ctccggcctcc caaagtgtctg ggattacagg cgtgagctac tgcgcccggc ctaagctaag
91861 tgttttaata catgacctca ctgacatttc acagtagggc tgtgaagtaa gcatgcagaa
91921 gagctacaga taagtttagg gacccagaca ggaatttgat caaccagcta aattgtgcta
91981 cctcagagcc agaggcctta gcaatgattt tgggtttttt cttaagagac gggagtcttg
92041 gtgtgttgct caggctggac ttgaactcct gggctcaaat gttcttcctg ccttagcctt
92101 ctaagtagct gggactacag gagtgcaccc ctgtacctgc cttgggtttt tcttgtattg
92161 atacttaata attgtacata ttattgttat tttttttttt tgagacagcg tcttactcta
92221 tcgtctaggc tgagtgcagt ggcacaatca tggctcactt cagcctcaac ctctgggct
92281 caagcaatcc tcctgcctca gcctcctgag tagctgggac cataggcacg tgccaccatg
92341 cccagctaatt tttttatfff tttgtagaga cgggatctgc tatgttgccc acactagtct
92401 caaactcctg gtctcaagcg atcctcctgc cttagcctcc caaagtgtct ggattacagg
92461 tgtgagccac tgcgcccgcac caagtctcag tttctaaatt tataaaaatc aggagtgcac
92521 accagagcaa gatttgtcaa agtctccaga caccagaYa tttgttactt tcagctattg
92581 cagcttcac cttctgagta catgagttag tgggcaagcc caacatttaa atttctttaa
92641 atggaagaaa gaaagtggat aagatagaaa aatcaggggtg ttgcacttta ttaagtgtag
92701 gtattgtttt gagaagcttt tatctcacac ccaataaaag tgtgcaggat tcctcttgtt
92761 ccagccttac ctccccgatg atcctagcac atacttgtgt gtatatacag acatgttaca
92821 gtgccaagtg tacttcctac tgtggtgtga tttaaaaaat tgaaataccc taaactggaa
92881 gaactcctca aggtctaaac tgccgaatcg aacttcctat tgtaatggaa atgttctata
92941 gctgtactat ctagtaccgt agccactagc cacatgtagc tgttgagcac ttgaaatgtg
93001 tctagtgtga cgaagaatta agaattttag ctgggcgcgg tggcttacgc ctgtaatccc
93061 agcactttgg gaggccaaagg tgggtggatc accaggtcag aagatcgaga ccatcccggc
93121 taacatgggtg aaaccccatc tctactgaaa aatacaaaat aattagccgg gcgtgggtggc
93181 gtgcacctgt agtcccagct actcgggagg ctgaggtagg agaatggcgt gaaccggga
93241 ggtggagctt gtagtgagcc gagatcctgg gctcactcca gcctgggtga cagagtgaga
93301 ctccgtctca aaaaaaaaaa aatttttaaa ttatgggtgc agtggctcac gcctgtaatc
93361 ccaacacttt gggaggcggg ggtgggtgga tcacttaagg tcaggggatt gagaccagcc
93421 tggccaacat ggccaaaacc ccatctctac taaaaataca aaaattagcc gggcgtgggtg
93481 gtgcacacct gtaatcccg gctacttagga ggctgaggca ggagaatcgc ttgagcccag
93541 gagatggagg ttgcagtcag ccaagatcat gccactgcac tccatccagc ctgggtgtcc
93601 gatcaagact gtctcaaaaa aaaattaatt atcatttttt aaaaaaattt tatttttatt
93661 ttttcgagac agagtctcac tctgttaacc aggttgaggt gcagtgggtg gatctcagct
93721 cactgcaacc tccgcctccc agattcaagt gagtttcctg ccgcagcctc ccaagtagct
93781 gggactacag gcacgcacca tcatgcctgg ctaatttttg tattttttagt agagataggg
93841 tttcactatg tttggcctca aactcctgac ctcaactgat ccgcctgcct cggcctccca
93901 aagtgtggg attacaggtg tgagccaccg tgcccagcca aaattttcat tttttgagac
93961 agagtctcac tctgtcacct aggcgggagt acagtggcga gctcttgggt tactgcaacc
94021 tccgccttcc tggcttaagc aatttttgtg cctcagcctc ccaagtatct gagattacag
94081 gcgtgtgcca ccacaccag ctatttttta ttttttattt ttagtagaga tggggtttcg
94141 ccatgttggc cagactgggtc tggaaactcct ggctcaagt ggtcctccca cctcggcctc
94201 tcaaagtgtc gggattacag gcgtgagcca ccacgtttag ctgagtataa ttttaaatag
94261 ccctatgtga caagtggcta ctttatttga cagtgtagat ctaagattaa ttctcaact
94321 gtttttgact caacaaagac atacctctga gttggcaacc agcaggggtg ataacgggcc
94381 agtgggtgata aaatcaaaga ataggtaatg aaacaatcat ccagttaaca atcagcaagg
94441 ttcttcagag cctaattaat gtttaattct aaataaattg caacaattaa gaaaagtagt
94501 gtttttgtag ttctttattg catctgcaga agagtactgt attttgtgag aattgggaaa
94561 tgtgttttaa agagatgtgt gaggaggaaa atctttcttc ctcactctta cagtgggttag
94621 gttcagaatt ggacagacca ggggcccctg cccaactctg ctgagtacca gttctgtgac
94681 cttgggcaag tgacctcacc tctttgtgcc tcagttttct ctcatacaac agggacaatg
94741 agcactctta tttcaaaggc tcattgtgag gaacaaaatg aaataatgtc ggctgggtgc
94801 agtggctcat gcctgtaatc ccagcactct gggaaagctg gatgattgga tcatttgagg
94861 tcaggagttc gagatcagcc tggccaatat ggtgaaagcc cgtctctact aaaaatacaa
94921 aaagaggcca ggcgcaggca gaccacgagg tcaggagtgt gaggccagca tggccaacat
94981 ggtgaaaccc tgtctttact aaagatacaa aaaattagct ggggtgtgat gtgcacacct
95041 gtaatcccag ctacttggga ggctggggca ggagaatcgc ttgaaccag gaggcgaggt
95101 tgcagtgcag tgagattttg ccattgcact ccagcctggg cgacagggcg aggctccatt
95161 tcaaaaaaaaa aaaaaRaaaa aaggctatgg ctcaYgcctg taatcccagc actttgagag
95221 gccaaggtgg gtggatcatc tgaaggtcag aagttcaaga ccagcctggc caacatggtg
95281 aaaccccatc tctacccaaa atacaaaaaa ttagccgggc ttgctgggtg gcgcctgtaa
95341 tcccagctgc ttgggacact gaggtgggaa gatcgcttga actcaggagg tggaggttgt
95401 agtgagccaa gattgcacca ttgctccagc ctgggcaaca agagcaaaat ttcactcaa
95461 aaaacaaaat aaattagctg ggaatggtag caggcacatg tagtctcagc cacttgggag
95521 gctgacgtag gagaatcact taagcccaga aggcagaggt tgtgggtgagc tgagatctcc
95581 ccactgcact ccagcctggg cgacagagtg agagtctatc tcagaagaaa aaaaaaaaaa
95641 catgtctgtg ccgtgcttgc cacttggaaat aaatggcagc tccactagtcc ccgagggtaa
95701 gggacctcac cttgccctgc ctgtttacta ctctgtaaaa ttgaaataac gcagctgggt
95761 gcagtggctc acgcctgtaa tctcagcact ttgggagtg caggctgggt gatcacctga
95821 ggtcaggagt ttgagaacag cctggccaac atggcgaaac tccattgcta ctaaacatac

```



```

95881   aaaaattacc tggatgtggc ggcattgtgcc ttagtccca gctacttggg aggctgaggc
95941   aggagaattg cttgaacctg ggaggcggag gttgcagtga gccgagatgg tgccactgta
96001   ctccagcctg agcaacagag tgagactccg tctcaaaaaa aaaaaaaaaa aaaaaagaaa
96061   taacactcta tgtaagggtt actgaaagga ttaaattgagg ccatataaac atataggcac
96121   agtgctttgt ggaggggggt ctgggttaaag cactggctcc ttcctccctt ctcagctaca
96181   gggcagggcc ttgtctgccc tgggtgtaggt catggaccgt cttgggtccc ccttccattg
96241   tcaggctgta ctgggttcct cccacagggt ctggcctagg agcaggatgt gttgtgagtg
96301   tgggtgtgact cttagtctct gctttctaa gacttgaaaa atagaggaa cccaggtgggc
96361   atacttggac agtggtgccc tgttgaccac ttctcgctga acttggaag gagggaatgt
96421   tttctggatg ggaagaatcc agtcaggcct cctggagggg gtggtaagaa tctcaagcct
96481   tgaaggatgg gaaagagcac aataacaaca gtgacaaagg atagatcaca aagcatcatg
96541   gactcacctg actcatgctc cgtgccaggc tgaggaagtg tttctgctg gcagtgagag
96601   aaggaagggc attctccagg tagaaggagc tgtttgtgca gaagcatgaa ggccgctaaa
96661   aggggggctg tgatagcaat gaggaggctg gggctggagg caggagatct gaggcggcct
96721   agtaaattgt ccagacctga gatggggcca tgactacctg gagcaggaca gagaggagaa
96781   ttccagagag ggcccaattc cagagatgtc agaagtagac tYgacatcca ctgtattagg
96841   acttggccag gccgagggag agagagtagt ctgaggcaag cctagtatat ggtcttggac
96901   actgggacca aggggtgatgt tcccagtaaa atgagcaacc caggaggagg cgcaggtttg
96961   caggaggagg tgatgaggtc ctttctgcac atcttgagtc cgctgtccct gtgggaggga
97021   cctctggggc agtcgcatgg gcaggcaggg

```

chrom 4 genomic sequence (SEQ ID NO: 2)

>4:36870401-36969350

```

1       taaaaagca tttccataaa tatatacaat cctgtcttgt caatcaaaaa aaaaaatgaa
61      aaaataaatc caactaaaag taagatatta acataatgtg ctaaattaag caaagctgaa
121     ttatctatct actcatggta attgctaacc atgttcattt gtaaaataga ctatactgtg
181     ataattcctc ataacataag aagttgatgc Mtttacaaaa acttatctgg gatagtttat
241     tgacttgact ggggtcttaca aatatagatt aggtatatgg atagaaaagg atttgactgt
301     aaaatttgca aaaacagtgt ctcaaagcat agtgatactt taacatgatg gaatttttgg
361     ctatgggata gttataactc acttctggca atgtgagctg actttatttg tgttaaaatg
421     tatcaatcat cttataaata aataacagag ctattaataa caattttgaa catttttccc
481     tacttgacct tttaaaaatc agctccataa gagacaaatc aattaatatg tgtttccact
541     attttttttc ttacattaca ctttgctgtt gactttaata aggcagagaa attggtgagg
601     gatggcactg gtattgggga aggcgtcaca gtgaagactg tgcctattct ttggcaggca
661     gattacatac ctcacaaaca tccctgggag atcagtattt taagccctgt tttttaggct
721     atctcatcat ggccaagggg catagataac taaacttagg gtcaccatcc agtctggcag
781     tagagttaca gaaagggtt ccaaggagtg aaccattcag agttgttctg gagattacac
841     tgtgaaagaa gtgtctctgg ttcatagtgt atgagtcctt tctatgctaa ctctacaaat
901     tcaggaggga aacaaaaaaa caaaacactt ccttttcttg ttaaagctca tagtctttca
961     gattcccaac ccatagttag acttggaag cattgttcac tgcctgggga gaggtacta
1021    tcaatggtac tactatcaat ggtaggagg ctggaattca gaacccaact tcagatccag
1081    cagatgaatc gttgaacaaa ttcagaaaag tgaatcttga acctcaaata gtgagggtcc
1141    cacctaacac atcaagctta agccacaaga aatattccag cccccaacct ttgatagacc
1201    tgagcctacc tacctgtaaa agccagggtc ggggttcacag tgcttatttt cctaccatgg
1261    taccttgctt gtatcacatt gtgttttaat tttatgctga ctagtccatc tcccctacca
1321    gacaatacat aaagatgggg attgagtcct ctcaccatth ggtagagaag gtaccatttc
1381    ctaccatggg accttgcttg tatcacattg tgttttaatt ttatgctgac tagtccatct
1441    cccctaccag acagtacata aagatgggga ttgagtcctc tcaccatttg tattctcacc
1501    atttggtaga atgtctggta aatgtagcac tcatcatgag tttggtgaat gaacaaataa
1561    acattgatag ctttgggcaa aataaactgc aaatttttaa ggatatgaac ttcaaattat
1621    aagatcttac actacagttt tgcaggatgt agcaggcaaa agtgactgat aaatatgttc
1681    agttattatt aactacacc cagaccatga gaaagcagtc ttagctatat tcatgtacac
1741    atagaatagt ataggataat aatgacctgt acctatatth atacctttat gcctatacct
1801    aaatctctac ctatttgtht ctgtgtcatc tgaatgaata cacagctaga tggatagata
1861    gatgatagat agatagatag atagatagat agatagatag atagatagag gcatgaggac
1921    caatttgaaa atataagcac tttatgagcc acatgttttt acattgtaat catttggttt
1981    ctacaaaaaa ttgaccccag agagggttaa caacaacaca tatcatactc tttgttccag
2041    caattagagt gctgtgggtg ttaagatatc aattataaaa tattttatta aaacacaaac
2101    acttttttct ttttgagcaa gatgattgat tattcacaaa tagtttcaaa ccacttgtca
2161    ataaaaatga gcatcgthtc caattcatca aaattatagg acttcattac actaaaaaca
2221    ataaatcaca catctaacag caaacggacc cctaataacc tttgttacct actttctaac
2281    atttcccaga gtgtgacatt gaactctcat gaggtgaagat gctctatttt ctagctgtct
2341    gtggcaaaat ataacagagt aacattaatt tctaaatgtg atttttgaga tgaaagggtg
2401    gtggtaaatt ttgcaattat cttttgaaag gtaagcaaaa tatactttgc tctttagaaa
2461    agattccatt tctatatcta cattataaac catatatcaa gtgattttac gagaaaaaaa
2521    gtaagatcaa gattacatat taaaacaaga gaaatggggg tgaagtctta gacttgacc
2581    ctggaaagat gatgaaacag gagagagctc ttttttgagg attctcctcc ctttcaatgt

```



```

2641 ccatccccca gcttctagag cttctcccca ctctgggagc attcatggta ctctccagac
2701 cccagtccaa tctcatgcat caatgtcaag taactccacc tgcctaactc attataaatc
2761 tgatttcaga ttgaaagata agacaactgt tccagatgac tacttctctt tttttccttt
2821 cggcggtggc gggggggctg ccataatttaa ctggaagtct ctttaataaaa agaagttatc
2881 tcatagtttt ttttttgaaa tttttatttt ttttaatttat tttatttttt attattatta
2941 tacttaagtt ttaggggtaca tgcgcacaat gtgcagggtta gttacatatg tatacatgtg
3001 ccatgctggg gtgctgcacc catttagcat taggtatatc tcctaagtct gtccctcccc
3061 ctccccccca cccacaaca gtccccagag tgtgatgttc ccttctctgt gtccatgtgt
3121 tctcattgtt caattcccat ctatgagtga gaacatgtgg tgtttgggtt tttgtccttg
3181 agatagttta ctgagaatga tgctttccaa tttcatccat gtccctacaa aggatatgaa
3241 ctcatcattt ttatggctgc atagtattcc atgggtgtata tgtgccacat tttcttaate
3301 cagtctatca ttgttggaca tttgggttgg ttccaagtct ttgctattgt gaatagtgcc
3361 gcaataaaca tacgtgtgca tgtgtcctta tagcaacatg atttatagtc ctttgggtat
3421 ataccagta atgggatggc tgggtcaaat ggtatttcta gttctagatc cctgaggaa
3481 cgccacactg acttccacaa ggggtgaact agtttacagt cccaccaaca gtgtaaaagt
3541 gttcctattt ctccacatcc tctccagcac ctggtgtttc ctgacttttt aatgattgcc
3601 attctaagtg gtgtgagatg gtatctcatt gtgggttttg tttgcatttc tctgatggcc
3661 agtgatgatg agcatttttt catgtatctt ttggctgcac aaatgtcttc ttttgagaag
3721 tgtctgttca tatcctttgc ccactttttg atgggggttg ttgtttgttt cttgtaaaat
3781 tgtttgagtt cattgtagat tctggctatt agccctttgt cagatgagta gttgcgaaaa
3841 ttttctccca ttttgtaggt tgcctgttca ctctgagggt agtttctttt gctatgcaga
3901 agctctttag tttaattaca tcccatttgt caattttggc ttttgttgcc attgcttttg
3961 gtgtttttaga catgaagtcc ttgcccattg ctatgtcctg catgggtattg cctagggttt
4021 cttctagggt ttttatgggt ttacgtttta gtctttaate catcttgaat taatttttgt
4081 ataaggtgta aggaagggat ccagtttcag ctttctacat atggctagcc agttttccca
4141 gcaccattta ttaaataggg aatcctttcc ccattgcttg ttttctcag gtttgtcaaa
4201 gatcagatag ttgtagatat gggcggttat ttctgagggt tctgttctgt tccattgatc
4261 tatactctctg ttttgggtacc agtaccatgc tgttttgggt actgtagcct tgtagtatag
4321 tttgaagtca ggtagcatga tgccttcagc tttgttcttt ttgttaggat tgacttgggtg
4381 atgtgggctc ttttttgggt ccataatgaac tttaaagtag tttttttcca attctgtgaa
4441 gaaagtcatt ggtagcttga tggggatggc attgaatcta taaattacct tgggcagtat
4501 ggtcattttc acaatattga ttcttcctac ccattgagcat ggaatgttct tccatttggt
4561 tgtatccctt tttatttcat tgagcagtggt tttgtagttc tccttgaaga ggtccttcac
4621 gtcccttgta agctggattc ctaagtattc tattctcttt gaagcaattg tgaatgggag
4681 ttcactcatg atttggctct ctgtttgtct gttattgggt tataagaatg cttgtgattt
4741 ttgtacactg attttgtatc ctgagacttt gctgaagttg cttatcagct taatgagatt
4801 ttgggctgag acaatggggt tttctagata tacaatcatg ccactctgcaa acagggacaa
4861 tttgacttcc tcttttccta attgaatacc ctttatttcc ttctcctgcc taattgccct
4921 ggccagaact tccaacacta tgttgaacat accagaatct ctgggacaca ttcaaagcag
4981 tgtgtagagg gaaatttata gcactaaatg cccacaagag aaagcaggaa atatccaaaa
5041 ttgacaccct aacatcacaa ttaaaagaac tagaaaagca agagcaaaca cattcaaaaag
5101 ctagcagaag gcaagaaata actaaaatca gagcagaact gaaggaaata gagacaaaaa
5161 aacccttcaa aaaattaatg aatccaggat ctgggtttttt gaaaggatca acaaaattga
5221 tagactgcta gcaagactaa taaagaaaaa aagagagaag aatcaaatag acgcaataag
5281 aaatgataaa ggggatatac ccaccaatcc cacagaataa caaactacca tcagagaata
5341 ctacaaacaa ctctacgcta ataaactaga aaatctagaa gaaatggata aattcctcaa
5401 cacatacact ctcccaagac taaaccagga aaacgttgaa tctctgaata gaccaataac
5461 aggatctgaa attgtggcaa taatcaacag cttaccaacc aaaaagagtc caggaccaga
5521 tggattcaca gccgaattct accagaggta taaggaggag ctggtaccat tccttctgaa
5581 actattccaa tcaatagaaa aagagggaat cctccctaac tcatttttatg aggccagcct
5641 catcctgata ccaaagcctg gcagagacac aacccaaaaa gagaatttta gaccaatatt
5701 cttgatgaac attgatgcaa aaatcctcaa taaaatactg gcaaaccaaa tccagcagca
5761 catcaaaaag cttatgcacc atgatcaagt gggcttctat cctgggatgc aaggctgggt
5821 caatatatgc aaatcaataa atgtaatcca gcatataaac agaaccaaag acaaaaacca
5881 tatgattatc tcaatagatg cagaaaaggc ctttgacaaa attcaacaac cgttcatgct
5941 aagaactttc aataaattag gtgttgatgg gacgtatctc aaaataataa gagctatcta
6001 tgacaaaccc acagccaata tcatactgaa taggcaaaaa ctggaagcat tccctttgaa
6061 aactggcaca agacagggat gccctctctc accactccag atgactactt ctcaaattgt
6121 ccctaaacat gctaacatgt aagtgaccaa taaataatat catgtttctc attggcattc
6181 ttatattcaa taaaataggt cattatatta catatgacat ctaatttgta aaaatataca
6241 ctttccccca tgggactcag tgtaactatt tgcactctga gtgtggaaaa acctgtgtcc
6301 catgaaaacg tctgtattct ttaagtggct ctcaactcaa tgtagataga tataggcata
6361 ggtgcagatc tagatgcagg tatagggtata ggttggtatt actgtacatc atgttatata
6421 aggaattctc ttctccctac tctttttctg aaacaaagct ctctttttca caggctatct
6481 gcactcagct tgtagttatc agaaaacagt tagtaattta ttttaaaagt aacttcagga
6541 agaaatggat gttgtgaatg aaggatttta aagcagcatg aagaataaaa tcagtcattt
6601 agtctgacag gcagtcgtgg gcagctattt gggttataag gcaactatct tgctgtttta
6661 accaaacccc atgccacatg cacgaccatt ggagtattat gtaagtgttc aaccagtgcc
6721 aaaattctat cattcttagc tgtctactca ctataggtag ggccgatccc caaattctaa
6781 aagattgaaa tggataggat cttgatacca ttttctctgt atgttttaaa atagcaagcc
6841 actcacttac aaatttgaac aggagattgc atttgccaaa catgtagtta taattgagat

```

6901	tttcattgtg	tacctctttg	cgaaaatgca	gatggattag	cattcatggt	cactgagttc
6961	tgtttccatg	gatatagttt	cagtcattgcc	aaccagggac	agattgtgta	ctttattact
7021	ttgtttcaag	tattattcaa	acatttataaa	aatatcccag	cactatacaa	cattatatgt
7081	taatgtagtg	gtaatatattt	ggtaatatatt	cgttgacttt	aaatgatttt	gaggttccaa
7141	tcacgatttc	ttaaaagtat	gcacctagat	tgtaatactg	aaagcctatt	ggtttaacta
7201	ggcatgctag	cttggcRtcc	agggaaactcc	tgaagaagcc	agaattaagt	gaactcgcag
7261	tttcattaat	atccaaagaa	gagttagcct	ggtaacaaga	tgtttcatct	actacaattc
7321	caaaaagctt	tagaaaaggc	aatggaggac	tacagctagg	agaaaattta	ctggtcagat
7381	aaatacaaaa	attattttcac	tcttccctac	tagactagta	aattttttaa	aactatgttt
7441	ttatatcttc	gtattttctca	caaccagatt	tttaaaattt	attagtacct	aatacacaat
7501	tgtaaattta	atgtcacata	tctgttggtg	gtcttttaat	tagaacctgg	taccaacaga
7561	gttttaataa	ctgacagtga	tgagcctgga	acgaataccg	aatatgcatg	ttattttcag
7621	gagtgtgttg	aggcattcca	agtggcataa	aaaataatgt	gtacatagct	tgtaaacgtg
7681	gaagttttatt	atatgaggat	aagttaattc	aattcaataa	gtaatttaat	tcaatgcact
7741	ttggatacat	tggagggaaa	aacagtcaaa	aaattttact	catggatctt	atatcctagc
7801	aaggagagacc	accaataaat	aatagatatg	ataaacaatt	gtgtgggtgtg	ttagaagggt
7861	acaaatgttt	tggaacaaaa	gaaaaagtag	agggMaaagg	gtaatcttga	atagtagtgg
7921	tgtgggctgt	tgccaagttg	cagtttttaa	aatgatcaaa	gtctgcctca	ttgacaaggt
7981	gagattttaa	caaaggcttc	aggagttag	agagttggcc	aagcaggtgc	tggggaaaga
8041	gctttccagg	cagaggcaac	acctagagca	aaagtccaaa	ggtgagagcg	tgctgatgt
8101	gttcaaggaa	gaccagggac	ataagtgtag	ctctccaggg	tagtgcaagc	agggaagagc
8161	tgtagaaaat	aaggtcagag	aggtaatgag	gaagcacact	cagtcataca	cagcctgaca
8221	catggtgatt	atatgaactt	tagcttctgc	tgagtacagg	gaagagccat	tgacagaattc
8281	tgagcagaga	aacagtctac	tgagatgtaa	gtttcaaatg	gatgattcta	tttttgtata
8341	gagtacagac	tatagagaga	agaggataaa	tgcagggtgac	caatttgagg	agggttgcag
8401	taatccaggg	acaacagatg	ggggctcaga	tcagagtaag	agggtgctaaa	aagtagttaa
8461	attctggata	ttgtttgaag	gtagagaaaa	aagaacttct	tgatggattt	aataaggaaa
8521	acatgagaaa	ggggggaata	gaggatgact	ttggcctgtg	caactcaaaa	gatggaattt
8581	cctcaactga	aatgaggaaa	actggatgga	gaaggttcca	ggaagaagat	caggcgttca
8641	gtctaggata	cgttcaagca	gaattgttag	acagttgtgt	atatgaatct	gaagttcaag
8701	tacaaaggtc	tggagtggag	gtttaaattt	gggagtcacc	agcagataga	tgggtactcaa
8761	agccactggc	ctggatgatt	ccaacaagag	agttcatgtg	tggaccaagg	actgagcctt
8821	ggcaatacaa	ctttaagtca	ggacgaagag	ggagattaac	cggaaaggag	cgcccagtga
8881	gttagaagga	aagcaaagga	tgtgtgtggt	ttttttcaaa	agctaagaga	agaaagtgca
8941	tcaaagggga	aggagaaatc	aatttgggtca	aaacctataa	taggtcaagt	gagatgaggg
9001	ggaaaaaaa	tggccgttgg	gttttagtgac	acagaactag	ttcatttggt	aattttaaata
9061	ttcaaccttg	catcagtatc	gccactttct	gaacactgcc	attttgattt	atgcatggaa
9121	tttcccccaa	ccaagtttta	tgtccttggc	tttcttttat	ttttccttat	aactgtcctt
9181	ttcttttggtg	tttatgggtg	aatattgggt	ttctcttaaa	tcttttaact	ccttatattt
9241	tatgtgcctt	ctcggcacat	gcttttgaat	tacattttta	aatttttaatt	tcatttcaca
9301	tttataatat	agagcaatgt	ttgaattcag	ctattaactt	ttatccatct	cttagtctat
9361	attgattttt	tggttgtctt	tccaaatcac	attcatgcct	tatttttagct	gccacattgt
9421	ataaagttat	ctagcattgt	ttaactttca	catctagtaa	gtagcatagt	aactgaattg
9481	taactgtaat	tgacaataaa	catctgtttt	atttcccat	tttttggtta	ttcaacaaca
9541	cagttgtatt	ctacctgggtg	cattcattga	atcttgctaa	aaaaaaatct	aatcacacc
9601	aatattttgt	ttctaactcc	tcctcttcaa	cagcctctag	attatatgca	ttttccatta
9661	cttttatattg	tattgcaaat	tactgtaatc	ttacttttgt	tacttttatt	tctggagatt
9721	cttttggttac	tgtttaccaa	ctgtgacttt	cattctggct	gacctttgta	atctcttatt
9781	tattcagatt	tgtgtcatct	tgctattgta	ggtagattta	tacatcctgg	aatggcattc
9841	cagtttactc	agtgttctca	aggcaataaa	tgtagtgcct	tgatgtgaaa	atataactat
9901	taatataaaa	tgagtgtgca	ttagagactg	caatcagtag	cagaatagag	gtaatatata
9961	ttgatagtta	ggaatattga	aaaggaaggt	aaaaggggaa	aatttattag	ctagctagta
10021	ataaaaactct	agaaaggcca	atgcaaagac	tttctatcta	tgcaagtcca	gagaactata
10081	catctaagtc	atagctctac	acaattgtca	aatccttccc	atttaaatag	taaatacatg
10141	ccaacatac	atacacttaa	acatcattaa	acaagaataa	gccaaggagc	atattaatag
10201	tcacttctcat	ctcttcctct	aatacttgct	ctgcttatat	ggacagacat	tttgagttct
10261	gacagaccat	ttatttagat	aggttcaatt	agcaagttat	gcaaggtagt	caaactgatt
10321	tgaaaaaaa	atgaatgtca	ttgaacactt	cactgcacag	gatgtcttca	gtttttattt
10381	tcccaataaa	tagtaagcta	tgtagtagac	tcttatggta	ataatttctg	tattctaaaa
10441	tgtcaacaaa	agaaaaatat	ccctcagaat	ttacttatgc	ttcagagatc	tttctaagga
10501	tttaaaacaa	tttaggtagc	cactctttta	aaaagaaaac	aaaacaacaa	tatgaaactg
10561	tacatatgta	attctctgtg	actcaaaact	caaaagtgtt	ctttccacgg	tagaaactca
10621	gaaggtagag	agaaaaacca	gctattttat	gtgtatgttg	ttttcagtta	ttatcacatt
10681	cttaatgaat	tttctggagg	tctacaatga	ccctagatcc	catgaaatga	taaattaaat
10741	gtgaaagtgt	gtcaagtact	tgtataagat	actccaatgt	cttcagaatt	tacaaaattt
10801	tctctgaagt	tatcaaggca	gaaaagtgca	gcgatcattg	agtcacgaga	tataaattct
10861	cttcatagct	ggttcaacta	gctgattgat	ccaatgagtg	ttgctctgcc	tccccattat
10921	ccattcaccc	ttatcctgag	agtcacttcc	tgatttccct	atcgggaaag	atgcctcaac
10981	tctgaatttt	ataattgtta	tgcttttatgt	tgcagatgga	tgaatatata	aacctactta
11041	aaagaagtgg	gaatttatatt	ttttatctag	agtcttttgt	caggcaatcc	ttcaccacaga
11101	gttccaaaaa	tgggaaaaaa	gacctagctt	ctatatcaat	tttttagttg	cttttatctc

11161	tgtgttatct	ttacttgatt	tccagctagt	aacctaaaaa	cccttaacca	aacatacaaa
11221	tcaagatcaa	aaaacaaaaa	tgtacagaca	taacatgaat	ggcagctgaa	ttagtttcct
11281	gtggctgcca	taacaaatta	ctacaatctg	ggaggcttaa	aagaacagaa	atttatcctc
11341	tcacaattct	taaatctaca	aatctaaaaa	gaagggtgtca	gcagggctgt	gcttccccctg
11401	aaggctctag	agaaggatct	tttcttgctt	tttccagctt	ctctttttcc	tataaagatg
11461	ccagtcattg	gattgaagg	ccactctagt	ccagtaaaat	ctcatctcaa	atcttaccta
11521	attacatctg	caaagacact	acttcaaaat	aaggtcacat	tctgaggttc	tggatgggca
11581	tgaatttttg	gggaacatta	ttcaatccac	tatagagata	aataacaata	aacaccaatt
11641	gcattgtgtg	actctcagga	cctcattaga	tctctttgga	tgtaggtttt	cttttcctgt
11701	aaaatatatt	aaatgggcca	aacaagggaa	tctttaagg	ttattctatc	cttgccctca
11761	atgaatccta	ggatcaaagg	acaatgtcat	ccaagtgttc	aggctatgag	cacaaaaaat
11821	tgggcttttc	tagtcataca	tgtacttata	tacaagggtgc	acataattatg	agtttggctt
11881	tgtaggacat	tttttcattc	tggagacatg	aaagatttct	tatcaagtct	agctgaattt
11941	gggcaatgtg	tgactcctga	ccatttttca	gtgatgttct	tggccatgat	attcagaaga
12001	ctgtgtgtgt	gtgtgtgtgt	gtgtgtgtgt	gtgtgtgtgt	gtatcccaag	tagctggaac
12061	tacaggcgcc	cgccaccacg	cctggctatt	tttttgtgct	gtagtagag	atggggcttc
12121	accatgttag	ccaggatgg	ctcaatctcc	tgacctcggt	atccaccgcg	ctgggcctcc
12181	caaagtgtg	ggattacagg	tgtgagccac	catgcctggc	ctatatatttc	ttttccaaag
12241	attttttaag	accatttgct	cttgtcttct	ccctgttaag	gattatagct	ttttaaatag
12301	cataatgatc	acttagcaac	taaagaattc	cacacagatt	tataagatga	atctgtttac
12361	cagatatatt	aatctaactt	gaaaacattt	tttagtactt	tatttgcagg	atgcttttta
12421	gcataaatgt	tggtggaatg	aatttggcca	tttcaacagt	ctttatttaa	atttgtttta
12481	taactaaaa	aatgttaatg	agacgggtgt	cttttccttc	aaatagaatg	ataggcaagt
12541	gcaagaatgt	tagagatcaa	cttgggttgt	gatgtttctc	ttttgagaac	atggacatgg
12601	gttgtgagtc	tgcttcatgt	aatcccaggc	actaggggag	ctgaggcgag	agaatcgctt
12661	gaaccagaa	ggtggagggt	gcagtgagct	gcactccagc	ctgggggaca	gagcaagact
12721	cagtctcaaa	aaaaaaaaaa	gaagaagaag	aaaaaagaaa	agaaatgtaa	cattgtaaaa
12781	tgatagtccc	tatggaaggc	agtatgacag	ctcctcaaaa	aagtaaacad	agaattaccg
12841	tattgatcca	gtaattccat	tactgggtgt	ataccaaaaa	gaactgaaag	caaagaatca
12901	agcatatatt	tgtactccta	tgtttatagc	agcattattc	acaacagcca	aaaagtggaa
12961	gcaacctaa	tgtccactga	aaggccaata	aataaaca	tgtatgatat	acatacaatg
13021	gaactttaat	cagcctctga	aaaggacatt	ctgatacatg	gtacaacata	cataaacctc
13081	gaagacatta	tgctaagtga	aataagtcaa	tcacaaattg	acaaatattt	attattccag
13141	ctctacgagg	tctctagaat	aatcaaattt	atagaaacag	aaattagaat	gatgggtgta
13201	atgggctaga	gaaatgggaa	aatggggagt	tagtatttaa	tgggtacaga	gtttcactat
13261	gggaagaaga	aaaatcctgg	agatggatgg	tggtgatggc	tgcacaaYga	tgtgaacata
13321	cttaatgaca	ctgaactgta	cacctaaaaa	tggttaaaaa	tctaaatatt	aattatgaag
13381	tgagcattaa	ctaacadatg	ccatatttcta	gagtattaaa	acttaactgg	aacaggaggc
13441	caggcacagt	ggctcacacc	tgtaatccca	gcactttggg	atgctgaggc	ggatggatca
13501	cctgaggcca	ggagttcgag	accagcctgg	ccaacatggt	gaaactctat	ctctactaaa
13561	aatacaaaaa	aatctagctg	ggcatgggtg	cacatgtcta	taatcccacc	tccttaggag
13621	gctgagtcag	gagaatcact	tgaaccaggg	aggcagaggt	tacagtgagc	cgagattgtg
13681	ccactgcact	ccagcctggg	caacaagagc	gaaactccgt	ctcaaagaaa	aaaaaaaaaa
13741	aacttaatta	gaacataact	aatgacactg	aactgtacac	ttaaaaatgg	ttaaaattct
13801	aaatatatta	tatgaaatga	gcattaacta	agacaggcca	tattctagag	gattaaaaaa
13861	gtcacaataa	attttaaatg	gtataattca	tatgaattat	tttctctgac	tataatagaa
13921	ttaaattagg	attctagaac	aatatctaga	aaatccctca	aatattttga	aactaaatac
13981	acaagtctta	gtattttatg	catcaaagaa	gaaatcataa	atgaaaataa	gaaagcaa
14041	tcatctggat	gaaaattaaa	acatctcaaa	atctttgaga	agtagctagg	gtagtattta
14101	aatggaaatt	catagcccta	agtgtcaata	ttataaaaaga	agataaattg	caagccaatg
14161	gcctcagggt	ctacttaaga	aaaagagaaa	caaattaaaa	ctgaaataaa	gtaagggaat
14221	attaaacatt	ggggtagaaa	tcaataaaat	ataaagcagg	aaaacaatga	agaaaaaaMt
14281	gaaatcaaaa	gctgggttct	tgagacattc	aatgaactgt	taaacctcta	gctagactta
14341	ttaggaaaaa	aatagaaaag	acacaaattt	ctaatagcaa	gaatgagaga	ggtggtacaa
14401	ttatgatagc	tctattgaca	tttaaaaaaa	taagagaatt	ctatttgcaa	attatgtaaa
14461	atatgtgaca	actcagaaga	aatatataaa	tttcttaaaa	gacacaacaa	actaatgaag
14521	ttcacttaat	aagaaataat	aacctgaata	acgagatatc	tattagggaa	attgaatttt
14581	aaacctcccc	ttaaagaaaa	ttcaaggccc	acatgtcttc	actgaggaat	ttgactaagc
14641	atttagtggg	gaaataatac	taattctgtt	caaatacttc	taagaaaatg	aagagaaaat
14701	tcatatcaac	tcatttttaca	aggccagcat	atccctgcta	ccaagtgaag	acatttgaag
14761	aaaattacag	accaatatct	ctcaacgtgg	aggaaaactt	tcttggtttta	ttagtcctga
14821	gagtttattt	gaagtaagtc	acaacaaaaa	ataataaata	cttgtgttgt	cttggtttta
14881	ctttcagcct	gaagtgtctc	aagcaaagaa	aaccatgaga	tagaataaag	ctggatacat
14941	acggacatag	aaactgggat	tctcctttac	atctttccct	ttctttcaat	atctttttct
15001	ctctttattt	taactattat	tttaagttca	gggatacatg	tgaaggatgt	gcaggtttgt
15061	tacataggta	agcttgtgtc	atggggattc	attgtacaga	ttacttcacc	accaggtat
15121	taggcctagt	accattagt	tatttttccct	gatcctctcc	ctcctccac	cttccaacct
15181	ccaataggac	ccagtgtgtg	ttgctccctc	ctatgtgtcc	atatgttctc	atcgcttagc
15241	tcccagttat	aagtaagaac	atgtggcatt	ttgttttctg	ttcctgcgtt	agtttgttaa
15301	agataatgtc	tttcagctcc	atccatgtcg	ctgcaaagac	atgatcttgt	ttttctttat
15361	gactgtatag	tattccatgg	tatatatgta	ccacatcttc	tttatccagt	ccatcattga

15421	tgggcattta	ggttgattcc	ctgtctttac	tactttgaat	agtgctgcaa	tgaacataga
15481	cgtgcatgtg	tctggaagtt	gaatcccaca	atatagaaaa	aggtaacaaa	aataaaaagt
15541	gggtctatcc	caggaatgca	agtttagttg	aagattcaag	aatcaattaa	tgtaattcat
15601	tataataata	gactgaagaa	aaaaacataa	tatcttacca	atacacgcag	aaaagtgggt
15661	gacatatcca	acatccatcc	ttgatttaag	ttaaaactga	aaactctcag	caagcttaaa
15721	atagacggga	acttccctaa	cctaacaaaa	ggcatgtagg	taaaacctac	agctggcaca
15781	cttagtagtg	aaaaattaaa	tgctttcccc	taagttcagg	aaccagaaaa	ggatacccac
15841	tctcatgatt	tctattcagc	gtcgtattag	atgttctagc	caatgcacga	agctgagtag
15901	aataaataaa	agacttccat	attagaagaa	aaactatgtt	tattcacaaa	taacatgagc
15961	atctgtgtcg	aaaagtcaac	ggaataataa	aagttactag	aactaataag	agtttttcag
16021	agtctaaaga	tttgaaacta	gtatattaaa	attaattgta	tttgtatata	catgcataaa
16081	tctcagaaat	tgaaacttaa	aaaacaagta	tttaaactag	cagcatagaa	tgtaaaaatac
16141	ttagggataa	atctcatgaa	aatgtgtaag	atctatacac	tgaaaattgc	aatacattta
16201	tttttttaatt	attttattttt	attattatta	tacttttaag	ttttagggtg	catgtgcaca
16261	atgtgcaggt	ttgttacata	tgtatacatg	tgccatgttg	gtgtgctgca	cccattaact
16321	cgtcattttag	cattaggtat	atctcctatg	gctatccctc	ccccctcccc	caccccacaa
16381	cagtccccgg	agtgtaatgg	tccccttccg	gtgtccaagt	gttctcattg	ttcaattccc
16441	acctatgagt	gagaacatgc	agtgtttggt	tttttgtcct	tgcaatagtt	tgctgagaat
16501	gatggcttcc	agtttcatcc	atgtccctac	aaaggacaag	aattcatcat	tttttatggc
16561	tgcatagtat	tccatggtgt	atatgtgcca	cattttctta	atccagtcta	tcattgttgg
16621	acattttgggt	tggttccaag	tctttgctgc	aatacattgt	taagagagat	taagtaagac
16681	ctaaatcgat	ggaaagatac	atcagttcca	tgagttggaa	gaattgtaat	atgtcaattc
16741	tgtgtacatt	aaccacaaat	tcaatgcaaa	ccaggcaaaa	tccaagtagg	cagattggta
16801	gatatcaaaa	acctgaatct	aaaattgggtg	cagaaatcca	aatgtcctaa	tgagccaaa
16861	acaactttga	aaaagaaaaa	gaaattggaa	agacctctag	taagaacaac	atgaacaaat
16921	gtcaaagtga	aagaaactag	aaacaaaaga	ctacatgtta	taagatttca	tttattttaac
16981	agactttaaa	aaaacagaaa	ctatagtcac	ataaagcagg	tcagtRgttg	cacgggggtct
17041	aggcatttgg	aggagagaat	taattgcaaa	gggacacaaa	tgtatgttta	aaattttaca
17101	tacagtaatg	gtgatggtgg	ttacaccact	gtctatatatt	gtcaaagctc	atcaaattat
17161	atattttaaac	taatgaattt	tattatacac	tattatacta	gagctaacca	aaataaaaagt
17221	gaaaatctct	gtgggggaaa	ctatagagaa	acataactc	ttatatgttg	gtggtaagat
17281	ttcaggactg	ttcaaccact	atggagagaa	ggttagtaat	atctagtaaa	atcacacatg
17341	catatgttct	ctgactcaga	gtttctcctt	ttaggaacct	attccaatga	tacattgaca
17401	aaaatatgaa	atggtgtaga	cacacagcta	ttcattgcca	acagtccttt	aatagtatct
17461	tataccataa	attaaagaat	aatgaataaa	caaagaataa	tacagccata	acaaaaagac
17521	acaacaaaaa	gtagtccatt	cagggtgggtc	atactggcca	aagatggaac	aatctgagca
17581	tcgattaaaa	taacggctgc	agtgatttga	aacctatcag	ttttgttaaa	ctccatgagg
17641	tcaaaatgat	acttgaaatg	tagctaactg	gtcatctcag	agagatgcta	tggagccaac
17701	tcattattct	gaaaactgat	aaataaaaagg	aaaagtacag	catatttccc	cccagttctg
17761	aatatactat	aacttgaggt	aattgaatag	ttgtggaaaa	ttattttaga	aaaattacac
17821	ctaagaaata	cagaaaagta	tgatggaatt	ataatatgac	tatttttaaac	ccctcctgaa
17881	aaaataaatt	tattcaatta	tcattgtggt	tgctaaaata	attaggtgga	gccaggcaca
17941	gtggcagggtg	ccagtcgtcc	cagttactct	ggagactgag	gcaggaggat	cacttgagtc
18001	caggagttca	aatccaacct	ggacaatata	gtaagacccc	catctctaaa	aagtaaaaat
18061	aaaattatta	tgggaaattc	tgatgcagat	tataacaatg	gatagaccat	agtgaaaaca
18121	cctaaatcca	ctgatcaacc	tgagcattat	taaaataagc	aatctgacat	tgtgggtctc
18181	ttgtttataat	gcagtaggag	tatttagcat	cacctacaaa	atatccttgc	caaattgtcaa
18241	acctaaatct	cctcaagcca	ataggtctta	Yaaactttca	caagataata	agagaaacag
18301	taaattatgt	taaacaaaac	catagagaag	tggtcagaaa	actgagaatg	ggagaaattc
18361	tatagaaaaa	tggtcaattt	ttacacaaaca	aaaaatgccg	agagagagaa	agagatgacc
18421	atagggttaa	aagctgaaga	aaactttaat	ttcaagttag	ggtagtttgg	agccgaccat
18481	tgctcttgct	gagaaaaatc	aaaacatttg	gatcactctc	tctctctttt	tttttttttt
18541	ttttaatggt	taaaacatca	gagaactgct	aaagtaaccc	agactggaag	aaacaatggg
18601	agagaagtca	gaaaacatgt	ttcagccatt	aattccctgg	ggaaatttaa	tggttctgctg
18661	tatagagaaa	gagccttaga	atctaggtta	cgcccaggca	aagagacact	gcggagataa
18721	gagaaaccag	cagagcattt	aacagttttg	tcaggctaga	gagacaaaat	tgacagacata
18781	aaggggacagg	atccaggcag	gcagtggttg	aaggattaaa	cctgaaacat	ggcaagtttt
18841	tctttcaaga	catttggtgc	attctaaata	tgtacatggg	aggaaatgag	aagttaggca
18901	gaaaatctct	gaaaagcaga	gtaggttttc	caacaatctc	agtaatgtag	gaattacagt
18961	ttaaaacctt	ctagatggag	gggttcccaa	caaacaccac	tgaacctcag	ttggaaacct
19021	gggaggcctt	tatactacaa	tcaagggtga	ctgagaggta	aaaaaaaaac	acccaaactg
19081	aaaccagta	ttgactcatc	tcacactttg	aattaatgtg	atcaggccca	cattgtcagc
19141	caagcagaga	aaagactaaa	ttctttctgg	aagaaaataa	catcatctgg	agtctataac
19201	attactaggt	tcaccaaag	aaaagagagt	gtaaataaaa	gtcaagaaaa	ataacatgat
19261	agaaatacac	caacaagtga	tcccaacatt	ggagttatta	gtaaattact	ttaaaatgac
19321	cttgaatgat	atcttttaaga	aaatatacat	aaattttacca	gagcttttgg	aatctatttt
19381	ttaaaaaaca	aaggtaaatt	ctaaaactga	aaaataataa	taactaacat	taggaactca
19441	atacgtgggt	tgagcagatc	agacacagaa	gatgaaattc	tgaaactaga	agaaagagca
19501	atagaaaaca	ggtgacatga	ttttttttgt	tcttgttgtt	gttttgatag	agacagggtt
19561	tctgcatggt	gcccaggctg	gtcttgaact	tatggactca	agcaatcctc	ccactttggc
19621	ctcccaaagt	gctgggatta	caggcgtgag	ccaccacacc	tcgtccagaa	aacagggtgac

19681	gtgaaagagg	aaacaactaa	cagaaaatag	agaaaactat	aagatgggta	caggatgaag
19741	tgaaatggca	aaatataaat	tttcttagaa	tcacagaagc	agagaacaga	aagaagcgca
19801	aaagcaaaac	tcgaaaagat	attagccaac	tctgatacat	agaaggaaaa	ccatactgta
19861	tttaggcaca	tcatagtaaa	actgcttaaa	accaaggaca	aaaagggaaa	tattaaattt
19921	acttagagaa	agaaagaaat	gttaaccaca	aagcaataac	aataagactg	agctattact
19981	ctcgacagaa	attgtgaaat	ttaaagcaca	atgatacaac	tgctaaaaga	aaatgatggc
20041	caccttagaa	ttctatcccc	agtgagaata	gcattacttt	ttttttttga	gacggagtat
20101	ctctttgtca	cccaggctag	agtgcagtgg	cacgatctca	tctcactgca	acctccttct
20161	cctgggttca	agcaattctc	ctgcaacagc	ctcctgagta	gctgggatta	caggcatcca
20221	ctaccatgcc	tggctaattt	ttgtattttt	cttttagcaga	gatggggttt	ccccatgtac
20281	cttttttttt	tttttagtaga	gacaggggtt	ccccatgttg	gccatgctgg	tctcaaacac
20341	ctgacctcag	gtgatccgcc	tgcctggggc	tcccaaagtt	tataggcgtg	ggcaatcgca
20401	cctggccgaa	aataacRttt	tttaaactgt	aaaataaagg	cacgacactt	tctgacaaat
20461	actgaggtaa	tttgtcgcca	gcagaccttt	actaaataaa	cggtattgtt	caaccagaag
20521	aaaatgatcc	catatggaaa	cacacatgtg	tggaaaagaa	tgaaaaacac	agaatatgta
20581	aatacattag	tatatgtaaa	gtaatatgtg	cagtacaaat	agtggcaata	atattttgtg
20641	aaacttaaaa	tatttataga	attaaaatcc	atgggtggcag	aaatggaaag	acggtaggag
20701	gtaaatgggg	ttaaaatgtg	caaaggtttt	aacattagag	aagtggaaaa	tagtaatttg
20761	cattaacta	gggtaagtga	aggatgccag	ctataatgtc	taataaccac	taaaagacta
20821	ttaaaagaag	taattaagta	aatgtagcaa	acataatttg	ttacttcaaa	agaaatcaag
20881	acagagaaaa	agcaaaaaca	agcagggtatg	ccaaatagaa	aataagacta	cagacataaa
20941	agcaagtata	ccaataatta	cattaaatgc	catgaactaa	atgattctat	ttaacaacag
21001	tacttgtag	gttgaattga	aaacaaaata	caactctatg	ttgctaagaa	gaaatatact
21061	ataaaaacat	aaattcgaaa	aagttaaaag	taaaaagata	cagcaagaaa	acaggacttc
21121	actcctacaa	cttgcaagga	actgaatttt	gccaacaacc	atgtaaactt	caaaaagaac
21181	tccaagtatc	tgatgagaat	atagctctgg	ccacaccttg	atctcaccct	gcacagagga
21241	caccatgcct	ggactcctaa	cctacacaac	tgtgagctaa	tacatgagtg	tcatttttag
21301	ctgctgtatt	tgtggcaatt	tgttacacag	caatagaaaa	ctaatacgta	acatgaatgt
21361	ccatccaaaa	attaattaat	tagttgtgat	atattcataa	tatgaagttc	tgcacagcaa
21421	tgagaataaa	tgcatatttg	ctatatgcat	taccatggaa	gagtctcagt	aacataatgc
21481	agaacaaaat	aaattagaca	caaaagagta	cctgcatgaa	tctatgcatt	tctagaaagt
21541	gcgtttgttg	ggttgtagta	aaatctcata	ttttctttga	taaaactcta	tatctttcat
21601	aagatttctca	agcaaatcat	gacccccaaa	aggcaagggt	cactgatgta	gattatgtta
21661	actatgtact	taaaaaaaat	taaatcgaca	taattgcctc	aattttttatt	gttgatgtag
21721	catgaggaca	gaatgcaatt	tgtattgttt	ggtatctttt	aagtttttct	tctgctaatt
21781	atcatcctta	aattcataaa	aaagcaacaa	agaaacttaa	tgctatggaa	ttacaaaactg
21841	agYgcaagtg	taaatctttt	gcagggtttta	tcatttttgt	cttcaagaaa	ggaatccaag
21901	gctaggcatt	gtggctcagg	cctgtaatcc	cagcactttg	agaggtcaag	gtgggaagaa
21961	cacttgagat	caggaattca	ggcccagccg	gggcaacata	gcaagactac	atctctaaat
22021	aaaacaaaca	attagcaggg	cagagtgatg	tgtacatgca	gtcccagcYt	ctaggaaggc
22081	tgaggcagga	tgatcactcg	gactcagaaa	ttcaagtctg	cagtcagcta	tgatcacacc
22141	actgYacccc	agcctgaaca	acagagtaag	atcctgtgtc	ttgaaaagaa	aagggaaagc
22201	aagaaagaaa	tccaatgttc	tgcaattctt	tcttattccc	tcccagttca	atcatgaatg
22261	tgctgtctgg	ggttgggtcag	attcgaggac	accaactagg	ccttctcact	gatgggtaga
22321	accaatgcaa	gtggtaagag	cttgagcttt	tcctctcact	ccctttgctc	tctcttttcc
22381	catgtgacag	caaccaagga	ttgggtcatt	tcaggagaat	tatttctagc	agaggtcagt
22441	atcagacatc	gcgaacaaat	atattctcat	tatgtactat	ctttctctct	ggtatcctct
22501	ctctgatatt	gacagatgYc	accagttact	agctagctYa	aaaagggatg	ttctatataa
22561	catgccctgg	gttactaaca	tatactgcac	caaaatttgt	gccttcaatc	cagaagttaa
22621	taaagtgtta	ccttgggtttt	cttcattcat	tgtttcttgc	tcattgcattt	tcctccagag
22681	ccttgtcaga	gaacatgggg	atgggtcagg	acaggatttt	gggtatttctg	gatcccagg
22741	tataaaaactg	tcttcatact	gtaagaaaaat	ttcacccctat	tttctgaaag	ctgtaggtaa
22801	tacccaacct	ttgcgtatta	agacatacag	tcttgactta	aaacataattt	atttagggat
22861	tgattttctca	ctcaaatagt	ttaggaacat	tctcacgaat	tcacttttgg	aatgagaata
22921	tcatatttat	gttacactct	ctctgaagaa	attgcatata	ttcacatagt	gctaacatga
22981	cacaggaact	atgtttgaa	gtgtttgtag	aaaatagctt	tgacatcaaa	acttgctctt
23041	taaagccagg	aaattcatat	tcatacttag	aacatcatag	atggatataa	ggacagggtg
23101	atagaaaatg	ctaaaaagtg	ctttacagag	agcagagagt	gtgtttgaga	aatgtgaatc
23161	atttttttaa	atgtaaaaaac	caaatgacca	ttgccttagt	ttcaacttta	gcctctgggc
23221	aattatcaag	cctttKcatt	ttcctgagtt	cctttKactt	tgagggtttt	cacattccat
23281	ttactgcccc	aaacacatca	gcgaactggt	taattcaatg	atataagttg	tatttttgta
23341	ttaaaataaa	cacctttgtc	attgatgact	aattcaggta	agaaaagctt	tttggtttgg
23401	gRtaaaaactc	attaattacc	taatgacaat	gaaattcagt	cattagcagg	gaaaggaaat
23461	atttctaggt	gttagagaaa	ttcatttttaa	ataacttaKg	ctgttttttt	aggtatacta
23521	cctttcctat	tctgtaatac	acacaaaaaa	tggatttttt	cctgttacac	accattcaac
23581	acaaaaccac	acaccaaagc	aatcacttct	tcaacaaacR	tgaatgctgg	gtgtcctttg
23641	attccattca	attctgactc	atctacctgg	agatagcagt	ttgagggtc	agtcccacag
23701	gactgccgtt	tcagatgcca	aatgcaagta	ataggttatc	acctgtagtt	ctaaccactc
23761	agctgtgaat	cagagttttt	atgacccctt	cctcatgttt	gattaatttg	ctagagtggg
23821	tcacagaagt	cagagaaata	tttatgttta	cccgtttatt	ataaagaaca	Wtggaaaggt
23881	tacagataaa	agtccagatt	gaagagatgc	atagggtgag	gtaaggggaga	agggatacag


```

23941 agcttcaaag ccatctccag gaacctccac atagtcagct ctccagaagc tccccaaacc
24001 aagatatatt tagtttttag gaaggcttca ttacacaagc gtgatggata gaattattgg
24061 ccactggcga tcaattcaac ctttagctct tctcccctcc ccagagggtg agatgtgggg
24121 ctcaaagttc caactStcta atcatgccct ggtctttctg gtcaccagcc ccaatcctga
24181 agctacctag gggttcccaa acctagtcat ctcattagca tgactaaagg cactcttaga
24241 cactctgcca gggccaggca cagtggctca catctgtaat cccagcactt tgggaggccg
24301 aggcggatgg atcacttgag gtcaggagtt tgggactagc cttgccagca tggtgaaacc
24361 ccatctctac taaaactgca aaaattagcc aggcgtggta gtgcacacct gtaatcccag
24421 ctactcagga ggcggaggca ggagaatggc ttgaacccag gagtcggagg ttgcagtaag
24481 ccaagatcat gccactacac tccagcctgg gtgacagaga ctctgcctga aaaaaaaaaa
24541 agaagcagta tgccaggaaa ctaaacacca aatatatact tcacaatatc gcacctacaa
24601 gatggtagat attatggttt accattcaaa aaataaaaaa aagcttcaaa ttgaaaacca
24661 ggcttatata caattttgaa aaagcaaata tctcccatg aatttttatg gggtgagtgt
24721 attagaattg ctgtttcccc tctgatataa attaaatggc tcccatttca aatccatttt
24781 tgtgattgag gcatactggg aatgtttttt ctgactctaa atatagtttt atttcagcga
24841 aggccttgaa gtaactcctc cagtcacaaa gcatactgga aatttgagtg tgactcaagc
24901 tcattgtgaa atgatgttta ccaagttatg attataagca aagttagtta ctctgttata
24961 aagagaatgt tgcaaaggct aacaagattt taaagtatag gttgagtatc ctttatctga
25021 aatttttgga gccaaaagtt ttcagagttc agatttggtt gcattttgga atatttgcac
25081 atacctaagg agatatcttg aagatgggac ccaagtataa acacaaaatg cattatgatt
25141 catacatacc ttgtacacat aggcctgcagg taattttata aaatacttta aataatttta
25201 ttaaacaatga aacagagttt gtgttaagca ctttggtatg gaattctcca cctctggtat
25261 catgtcaggg ctcaaaaaaa ttttagattt tgtgattttg gattatgatt ggatgctcaa
25321 cctgtatata tgtatataca ggtatatata tatatatata tatatatata tatatatata
25381 caccttcata aaaatatatt tcacaaatgt aatataaatc aagctcYctc aggttttctt
25441 ataaaacatt tttaaacgta gctatcaaat gcttctctgg attaagtaac attatctgaa
25501 atttgtttta ctctactaca ttattgctgg taaattatga ttttaagtac aatgatgttg
25561 gccaaaatta aggagcttta taagaaactg gcataatgaaa tttattttat ttattctgga
25621 catactgttg agggtaattc tgactccatt aactccatta aatagtcttt tgtttttgtt
25681 tttgttttgt ttttgagacc ggggtgggtg tgttgcccag gctggagtgc agtgacaaaa
25741 tcatagctca ttgtaacctt ggagtcctgg gctcaagcta tctcctgccc tcagcctctg
25801 ggacttacag ccatatgcca ctgcactgga cttttttttt tttttaattt ttgtagacat
25861 ggggcMtggc tatgttacct aggcctggtc tggactccta gccttacaca atcctcctgc
25921 tttaacctcc caaagtgtcg ggattacaga tttgaaccac cacacctggc ttagtcttgt
25981 attgttgaca tccgccaaaa ctcaccaatc aattgatatc aaaaaaacac ctataatcac
26041 acaacatata cagttttttt atttagcttg ctatggcaac ggagaacata cccaggggac
26101 cattaggagc atcttagtaa agtgaaacta gaaggggctt cttatggact ctggacaagt
26161 gttggagggc tctgagaaca gattatgaaa gtaagtggg tgctatcaga gaagagaggc
26221 aattcgataa tgggtatctc aatgatgtcc cccagaagca gggacaatga aaactaaaat
26281 cacattgtca ttgcaaggaa gcagagatca ctcagaaaag gggatgtgag tcattttatg
26341 gttgcagcac agccttgcc tttgttagct agaaacactg ttgttactgg aagcatcact
26401 aaatttcctc tgacctgtc tgcatccatc gaaaagagtg gttggttttg gttagaacca
26461 tcactgattg caagcagggc acatttttgt ttcctcacga atccaacaga acagaaaatt
26521 attagtctct actaccagag Rtgtgggtgc ttcctcctcaa ccactggttt gttttMatct
26581 tattaaggct agaaattgta aaaaagagaa aaagactgac tccatcctct aagtgactgc
26641 tagaacctcc caaggcaaca cagctacagt gcactatatt gacaccaaYg gaatcagtag
26701 catcatctta attttcctaM cttcttttcc ctttacccaa ttttatggct tatttccatt
26761 ttttacttta catgttttga aaatcacacc aatttttttt taggctaaag cagagagtaa
26821 ataaaaaata actgtcaagc ttggattgtc ttttatttgt gagctcagaa tcaggatgag
26881 aagaaggtag gaagttgtta tgaatgtgga tggaaagtac ggacaatgct gggaaacaag
26941 ccagtattaa ggactgtacc catttctaaa ctgggctcca tctgtaactg ccttgtgac
27001 ctacagcaag cattgaactt tcttaagctt tattttcctc atgtttaaag tagaataata
27061 ttgtaccaat atagtttaga taaaataaga attagcatgt gaaagacttc tcRtaatttt
27121 acatgacaat gtatgaatat tttgttaaaa atttagtgcc aaaYtctttg tgcacaaaag
27181 gcataYtggt taaacaaact ggtatctacc tatcttagaa atttttatta ttaacagatt
27241 taaagccaaa tataacaata tacgcaaaag taggagaatg ggtttctaaa tttttggaaa
27301 acaataatag gagttcttaa gatgcatgaa aggcaactga atttcatgac agaaatagta
27361 agaaagaagg aataagaaaa tgtttcttgg ccgggcgcag tggatcatgc ctgtaatccc
27421 agctctttgg gattacaagg caggtgggtc acctgtcaga agttcaagac cagcctagcc
27481 aatatgatga aacctcgtct ctactaaaaa tacaaaaatt agctgggcat gatggccagt
27541 gcctgtaatc ccagctactt gggaggttga ggcaggagaa tgccttgaa ctagagagg
27601 gaggttgagc tgagccgaga tgcgcgccact gcactccagc ctgagcgact gagcgaatct
27661 ctgtctcaaa aaaaaaaaaa aaaaaaaaga aaagaaaatg tttctttcct tgaagggtgac
27721 tataatgaaa tctttcactt ttctttcatc gtagaaagca agaatacaca ttatacagca
27781 attatgcaaa acctcccatg ctcataaata ctaatctaata gagccctgat tcagattcta
27841 aatcatccaa ttaaatgcta attggcttat tctctttaaa atgagtttac actgattcta
27901 ttcatttcct gatcttttga cgtatgagtc tagtttctct gattaaaaag gaccatggct
27961 ggatggtagt aataagaaag caagcacata aagtatcaca gagcccatg gccaacatag
28021 cataaaagta tctatgaaga cgcaaaatat acttttacca tatatgcctg gattttacac
28081 taacataagt attgtatcct acaaagagtc atagagacac attgtgctca tttctatact
28141 gtcatactta tcaaaattta tatgcagttc atctttgcaa attgtcttca gagacggttt

```



```

28201 agaggcaaca tacgataaacc attttttgcac cagactctca tctacatatc aaccacacat
28261 agccttcttt tccacagtca cctctcattc aattaaaatg gctctgaatg aatgaccttt
28321 gggtgtttac aaataccaag Wctgcctgta agagcttaag ctttgctgcc attgaagaca
28381 tgcagacatc agctccagaa tgtgctatgg ttgagttctg cataagtctc acctgatggg
28441 agtatcctca gagaagagct ggctgttgca caggaggcaa tgctccctgg aaaggaaccc
28501 agctcctatg cctgggaaac agtcacattg cttcaggggtc acgttttgaa aatactgtgt
28561 atagcctatg cataaaactc ttgtaaaaca tttgcaaaga cacctgatac tttctattct
28621 tagctcaaga gttcaactca ttttatttaa aagatattaa aatattaagt ttgcagaagg
28681 ctggtattac aaaaacctga tattcaacag aagtagagtg aattaagatg gtagaagttt
28741 gcttccattc acattctcca tgaagccaag agaccacaag tctacctaga agatttcgta
28801 tcttcccagg taatcacttt aaaaggtgac tcagaccagt gtgtaggtct atgtttatct
28861 ttctgtccat cctaaaccac ccctgtgagc aggatacaga taaggaaaag ggaagattgt
28921 ttcactagtc tggcaggcaa agtctagata actgattgaa agatgccatt atgggacata
28981 ggctgtgttc agcctaccta gttgtaaggc acacgataag ataaaaatcc caggaaagat
29041 acatttttga aatcctgctt ttgactcagt ttttcaacag gcattgtcat ggtgatgaga
29101 agagaaaaac ttgggagaaa acgctagaag aaattaaaat gatgtgacat gatatctacR
29161 taaggttttc cctgacatag acctgttcag gggccttgcc agatatttat gacactgtgg
29221 atgccatgtg gttagtggaa cttccagagt tcctgtaagc cacaccagca tctgatctct
29281 gagtttctat agggccatgg ctagtaggtt gatagatctt ggtgatactg aaacgttaat
29341 acagccaagg ccatttttggg tgtacatgta ggtgtgtgcc tatgtgggtg aaattgctga
29401 ttttatctcc cacaatatgc tgagtgatca tgaaagtaac attttaaatg tgagtccaga
29461 gtatcaactg gttttatcaa aacctaatg gaaaaagtat atatataat atatatatat
29521 atatatatat atatatatat atttatatat attccacctc tctaggatat ttttgggtgt
29581 ttttataatt gttattttca ttgtagtaag agtatttaaa tgagatctac ccttttaaca
29641 aatttttaagt gtacaataga gtatcattga tgaatataaa tacattatta aaaagatata
29701 tgttgggtgag gttatgtaga aactggaacc cttgtacatt gttgggtggga atgtaacata
29761 gtgctgccac tacggaaaat agtatagagt ttcctcaaaa acttaaaaat agaactgctg
29821 tatgatccag caatcccact gatYggtatt tatctaaaag aattgaaact cagattttga
29881 agagatagta tttgcacccc tattttcatt gcaacattat ttacagcagc caggatgtgg
29941 aaaagtgtcc attgatggat aaatgtgtaa agaaaatgtg gtatatacag acaaggaatt
30001 ttattcagcc tttaaaaaaa ggaaattctg caatgcaaca acatgaagga acacggagga
30061 cattatacta agttaaataa atgagacaca gaagggccag ttctaagctc tcccgggcct
30121 gaaagcttaa gtagatgaaa aactcctccc ttctcaggcc cagccggaag acgcaaggcc
30181 acttgcgta gcagcgtgcg tcagcaaggc agcagaagca ggaagagagc cagcaagaag
30241 acacctacc tggcagggaag acacgtaccc gtgaagatag agaaagaggc catccaggta
30301 caacgtagca gttacctcag aataggacac ctctgttttc caggagacta taaaaccttt
30361 gcccctcct cacttggggg ctgacgccat taggcctcag cccgcctgca cccaggcgct
30421 cattaaaaca gcatgttgcc cggcgcggtg gttcatgcct gtaatcccag cactttggga
30481 ggcctaggcg ggcggatctc gaggtcagga gatctagacc atcctggcta acagggggaa
30541 accctgtctc tactaacaat acaaaaaatt agccgggcat gatggcgga gctgtagtc
30601 ccagctactg gggagagctga ggcaggagaa tggcgcgaa cggggaggcg gagcttgcag
30661 tgagKggaga tggcgctact gcactccagc ctgggaggca gagcgagact ccgtctcaaa
30721 acaaaaaaaa aacagcatgt tgctccacac tgcttgtgtg tgtctgctgg cgcactcttg
30781 gtgttcgaac tgatacaaga accttacacc aatactgtat gattcttttR tatgatgaat
30841 gtaaaacagt aaaactctta aatgcagaga gtagaatggt agttactagg gactaaaaag
30901 agggggtaac tgggaattac tattcagcag gtacaaaatt tcagttaacc aaaatgaatt
30961 agttctagag atctgctgca caacactatg cctattgcca ttgtcgtttt cttgttttgg
31021 tttgggtttg ttttatgctt aatttcttct taaaaaaaat Kattgactca agccctattt
31081 agctgtccag gaaatctatg ggggaacaaa gaactataac acaccagtca cccagtctgt
31141 cccctttcca ctctgttaga gtgagatgtc ttagatagat ttgatctcag gctccaatcc
31201 tgtcactcag ttatgcttag cattccaaga tccttagcaa gacataaacg tcctgtcact
31261 gtggctgcta ccaaccactc tagctgcaac tcttgccctc tccctatatg cagtctaggt
31321 tccaacagta ctgaaccact gaattccttg aatttgaata cgatttaaca cttccttgcc
31381 tcatgtgaca ttctttggtc agaattcatt tcctggctct cttttttgcc ttgataatag
31441 tagctgtatt cctaggctgc ttatttacat atatcttctg ggaagccttt ctttttaaaa
31501 tttgtacaaa tttatggggg atRtgtgact ttttttatgt gtttatagca tggagtgatt
31561 tcaagtccag gtattcaggg tgtccattac cccagtacaa tacgtttttg ttaactatag
31621 tcaactctgt atcaaacatt ggatttatcc cttctattta actgtatgtt tgtaccattt
31681 aaccagtcct tttcatcttt ccccgctctc ctgactcacc tttcccattc tctgttgtct
31741 gtctttactc tctactttta ggtgaccaa ctttttagct cccacatatc agtgagaaaa
31801 tacaataatt gcctttttgt atctggctta tttcatttaa gataatgact ccagtttgat
31861 gtttatgcaa atgacattac ttcattctat tttatggctg aatagttttc cattttgttt
31921 atgtatgcca catttttgtg agccattcat cattgatgga catttaggtt gattttatat
31981 ctttgctatt ctgagtagtg ctgcaataaa catgttagtg caggatctc tttgatatac
32041 agattttctt ctgtgaagcc ttttgtgatt taacctccag tttcatctat tagacatcta
32101 ttattttact accagtatct attctaacaa cattatcatg gacatcctta aataaatgtc
32161 tcctactaca ggtttcaagt ttgcctggga ttgaagggtt ggaggatgtg ggacttccaa
32221 tgcaaaaact gggacagtga aaaccaggat agttgggtcac cctaccatgg atgggacctg
32281 acctctgtc tagtcacttt tgtttaaaat atatttcccc cattarGctt tgatgttctt
32341 tgaagRcaat gtcctccYgt tggctccttg catataatac ttttcttgat gcttaataaa
32401 tattcagtga atgattttct attttcaaag ggcttaaaaat agctcttggg gtatgaacat

```

```

32461 atttattttta tgggttggtt ccttcctgtt aatagtagca ctgtgatatg gtttggctgt
32521 gtccccaccc aaatcctatc ttgaattccc atgtccttcc ctgtgtgttc tcatgataga
32581 gagtaagtct cacaagatct gatggttatt ataaggggga attttcctgc acaagctctc
32641 tttttgtgtg ctgccatcca tgtaagacat gactggctgc tccttgccct ccaccgtgat
32701 tgtgaagcct caccagccgt gtggaactgt aagtccaata aacttccttc ttttgtaa
32761 tgcccggctc caggtgtgtc tttatcagca gcatgaaaat ggactattac agtaaattgg
32821 tacaagtaga gtgggggtgt gctgaaaaga tacgtgaaaa tgtggaagca actttggaac
32881 tgggttatag gcagaagtgt gaacagtttg gagggctcag aagaagacag gaaaatgtgg
32941 gaaagtttgg aaccgtagag acttggttga tggctctgat caaatcctg atagccatat
33001 ggacaataag gtccaggctg aggtggtcta agatggagat gaggaacttc ttgggaactg
33061 gagcgaaggt gactcctgtc atgttttagc aaacacactg gtggcatttt tcccctgctt
33121 tagagatttg tggaactttg aacatgaaag agataattta gcgtatctgg tgaaagaa
33181 ttctaacacag caaagcattc aagaggcgac ttgggtcctg ttaaaggcat tcaattttat
33241 aggggaagcag agcataaaaag ttcagaaaat ttgaagcctg acaatgtgat agaaaacaaa
33301 agcccatttt ctgaggagaa attgaagctg gctgcagata tttgcataag taatgaggag
33361 cctaattgtt atccccaaag cagtaaagaa aatgtctcca gggcatgtca gaggtcttct
33421 tgtcagcccc tcccatcaca gactaggagg cctaggagaa aatggtttca tgggccaggc
33481 ccagggttcc tgtgctgtgt gcaatctatg aagttggtgg cctgcaccc tttcagagga
33541 gccatgacta acagggggcca aggtacagct caagctgttg cttcagagga tggaagcccg
33601 aagccttggc agcttacatg tgggtgttgag cctgtgggtg ccagaaatc aagaattgag
33661 gtttgggaac ctctgtctag atttcagaag agttatagaa atgcctggat gccagacaa
33721 aagtttgcgt cagggatggg gccctcatgg agaactctg ctagggcagt gtggaaggga
33781 aatgtggggg tggagtcca acacagagtc gctactgggg cactgcctag cagagcttga
33841 gaagaggggc accatcctcc agacctcaga atggtagatc caccgacagc ttgcactgtg
33901 cacctggaaa agctacagac actcaacacc agcccgtaga agcagctggg agggaggctg
33961 taccctgcaa agccacaggg gtggagctgc ccaagaccat ggcagcacac ttcttgcac
34021 agcgtgacct gcgtgtgaca catggagtca aaggagatca tttggagtta taagatttga
34081 ctgccccggg ccgggcgcgg tggctcacgc ctgtaatccc agcacttttg gaggccgagg
34141 cgggtggatc atgaggtcag gagatcgaga ccacctggc taacaagggt aaaccccgct
34201 tctactaaaa atacaaaaaa ttagccgggc gcggtggcgg gcgcctgtag tcccagctac
34261 tcgggagggt gaggcaggag aatggcggtg acccgggagg cggagcttgc agtgagctga
34321 gattgcgcca ctgcagtccg cagtccggcc tgggcgacag agcgagattc cgtctcaaaa
34381 aaaaaaaaaa aaaagatttg actgccccac aggatctcag acttgcattg ggctgtagc
34441 ctttttgttt tggccaatgt ctccattttt ggatggctgt atttacccaa tggctgtacc
34501 ccatttgtat ctaggaggta actaacttgc ttttgatttt ataggctcat aggtggaagt
34561 gatttgcttt gtcttggtat agatttttga ctgtggactt ttgagttaat gctgaaatga
34621 gttaagacct tggggaactg ttgagaaggc atgattgggt ttgaaatgtg agaacatgat
34681 atttgagagg gaccaggctg gaatgatatg gtttgtctgt gtctccactc aaatctcatc
34741 ttgaattccc atgttttgtg ggagggactt ggaggagggt aatttaatca tgggggcaga
34801 tctttcccat gctgttcttg tgatagaaag taagtctcat aggatccgat ggttactgta
34861 agggggaggt ttctgcaca agctctcttt ttgcctgctg ctatccacRt aagacatgac
34921 tggctgtccc ttgccttctg ccatgattgt gaagcctcct ctgccatgtg gaacYgtaag
34981 tccaataaac ttctttcttt tgtaaatttc ccagtcttgg gtatgtcttt atcagcagca
35041 tgaaaactga ctaatacaca ctgttRataa gagtttaatt aaaaaccccc agaaaMagtc
35101 taaatgtcca ttaaccaa atgtataag tacatgttga ataatatac tatggtccag
35161 tcactggaat agtatacaga aacaaaaatt agttgactac caatgtacaa agcagattga
35221 tgaatcttga aattataatt tgtattatat ttggaagata caaaagaata cataataaaa
35281 tacgtatcaa atatatttta atatctgcta aaggggaaaa gaaaaaagac ttccattatc
35341 aatcaatatg tgtgggattt tattattttc atcaRtacta ttacttttag aagcagctac
35401 tactattgaa cattcattcc atgccacaca tttagccctt aatatacatt atcttatttg
35461 attttacttt ttcaataact ctgcactcta taggtgaaga aaccaagata ctgaggtagt
35521 aaatgcctta ccaagatatt gaggtagtaa atgccttacc ttgccttgcc aaaccaagat
35581 actgaggtaa taaatgccat ataaatatgc tgttagtggt aaagccagat ttcaatgctg
35641 gtcctacctg gattcaaaac taacatttgt tcaatgtact atattaataa tccatcta
35701 gatctcaatt atctgttaat gtgaatgctc tttgtggtaa acacactgca ggggtcccc
35761 tcctcctatc tccatgatcc ttgcctccca gtatttatgt ctttgtataa tcttttctgc
35821 ttgagttgag gcaggacctg ttacttgctt ctaaccagta gaatatggca aagggtgatag
35881 atgtcacttc tgtgattaca ttacattata taggattcca tcttgctatc agaattattc
35941 tggagactgt ctcttaggc ccatatgaca gccctcagct caagatagtc tccagctaat
36001 ttccagcaag aagccagggc tctgagtcct agaggcacat ggaaatgaat tctgccaaca
36061 gtcagcttga aagaggatgc ttctctagtt gagcctccac atgagaaccc agcccagctg
36121 acggcttgag tacagcttta taagacccta agcagaggac ccccgcttaa tttgtgcctt
36181 aattcctgcc ctaaaacaca attaggtaat aaatgggtgc tgttctcagt tgctatgctt
36241 gtgatagttt gttatgctac aaaagaaaat gaatacacta tcttttttaa aaaatcattt
36301 tttYcctcaa agacaagtta tgcacttatt atgggagatt attctacatg tttatagaag
36361 gccttaacca gagtttgga ctggactgcc tgcctgatga tgtaattata ggaattatat
36421 cccaaaaatt agtaatatta tgaaacttgt aagagtacaa aataatatct ttgtgcatac
36481 tgcccacttt gaagctcagt tagtgctact ttgactaggt atggtgtcat gctgagggtc
36541 aggttccagc cccagctgag ggttgagggg agtgggtgga catggggcag ggagctggaa
36601 gaacacttga gagacagcag gtaaatgaga catggcttta ttcagaagcc tcttctcagg
36661 gtcagtgtta catttataca ctacacaaac aatagtggtc gagagccaga tWgggtgctt

```



```

36721  ttctatgtta tgtcaacatg gctatgatta tataaggcat gggactatgY gctgtgcta
36781  caaactcgct gagtcaccca ggctgtttac cttggcctat gctgtgccc ctatgcctgc
36841  ttggctgcag cacagccatg ttccttacat atggcattgt tgaaattgaa atgtcatagc
36901  cacactgcag aagagagaca tccaccagtc ctcattagac aacatagctg tattaatatcc
36961  tgctctcttc agaagccaag acctatgcat tccttcatga atagctttta aagggttaatt
37021  aaaagcagtg agtaataaaa atttataagc ttctgcttat aatttttaat ggtaccattt
37081  ctgacctttt gattgtgatc ccatgatgta ctatccagat gccagttgtt cactgttccc
37141  aacaacttaa aggagaactc aacagaacat agagtccttg cttttccagg aaagtttctt
37201  caaggtttgt tctgggtgatg acaaattcct atggctgtta gggttttctgt tgtgaatggg
37261  atattctttt cttggagatt cacaatctac attagcattt aataaatatc aaaaagtttc
37321  aactaagaaa aataattaac aRtttcttta ctagcattac atgtacttat ttgtcctcag
37381  aaagctttct caaaaacacc ttaaaaactt aRtaactcct gcttgagaaa gagtgtgtga
37441  aaagaatgaa ctcatcaatt tgggaatcttt attttaaaaa atatttacag tagccttcac
37501  acttgaaatt tgaagcatca aatctattaa ataacaaaac aatatcagag caagtaaaac
37561  taaaagttca catggaaaaa ttttaacaata aaacattatt agaaactaag tagtaatatg
37621  tgaccaagac tggtaagag ataaacttgc acatattaat gctgttatgc tcagctttta
37681  tgtcccagat aagactaata aagaatgatg tcaatgttag gaaggaagat taactacata
37741  gcaatatatt tgtattgtca atttgaatat ttactgaaa tatcagcaa tggtatatat
37801  ttgaattttc taacacagaa gttaaattgtc ttctgtcttc aaattttatt tgtattcacc
37861  aacaccaata aggcaggggt atgYtcccac atgccaactt agctacagtg atctctttgc
37921  agtttcataa acacagcacc atctcccacc ttagcactta ctgtctttct gctgaaatt
37981  ctcttcctcc aaatgtctga atggcttact cccttgtttt atccaggtat ttgctcaa
38041  atctcatcag ctctttcctg gctaccttcc aaaaagKggc acatcaccag cctcacttcc
38101  tcatcccttt actctttata tttttcttaa ttgaaataat ctatacttga gatagtttct
38161  gttggcttac ttgcttattg actatttacc ctagataccc aactgcaata taggtttctt
38221  gacagcagag attttgttca gttgtggatc ccagcatgt agcatagagc ataattctca
38281  ggaagtatga aataaatagY Rcatgaatta atggaatagc agaagttcat cttcagaag
38341  agacttatgg gcagtcgttt aaggtaagtt taacatagga aaagcagtga aattcaccat
38401  attaagacta aaaaagaaat atgcaatcat ctcaatgcat ataaaaacac atttaacaaa
38461  atctgacata tatttttaat gaaaactgtg cacacactag aaatagaagg gaaccctctc
38521  aacctgataa tcataactac aagaaaagct acagctaaca tcacaatggg aaaagactag
38581  atgctagatg ctttcttcta atattggaaa caaggcaagg atgtccactg ccagcactta
38641  tattcaacat tacactagag gtcctagtca gtaaaataag gtgagaaaaa aattaataaa
38701  agccctccag aaaggaaaaa gagcaaataa aacaagtcta ttacagatg acataattgt
38761  ctatatagag cattatatgg agtctattaa aatgttacta gatccaatat gtgaatttag
38821  caagatggca gagtaagaaa tgaaacatac aaaatttatt gtgtttctat aaactagtga
38881  tgaataattg gaaaatgaaa ttttaaaaca ttatcattgc taccatgagc caataaattg
38941  aaaaatttaa gataaatgga taaattccta gatactatca agattgaacc aggaagaaat
39001  tcaaaacctg aacagaccaa aaacaagcaa tgagttcaaa gccataataa aaagtctact
39061  agtagaggct ggggtgcggtg gctgatgcct gtaatcccag cactttggga ggctgaggtg
39121  ggcagatcac aaggtcagga gatcgagacc atcctggcta acacagtga accctgtctc
39181  tactaaaaat acaaaaaaaa aaaaaatta ggcattgggtg caggtgcctg tagtcccagc
39241  tactcgggag gctgagtcag gagaatggca tgaacccagg agacggagct tgcagtgagc
39301  tgagatcgtg ccactgcact ccagcctgag tgacagagtg agactccatc tcaaaaaata
39361  aaaaataaaa aaagtctact agtagagaaa agcccaggac ctgatgactt cactgctgaa
39421  ttccaccaaa tatttaaaaga agaactaata caaatcctat tccaactatc atgaaaaata
39481  gaggaagagg gaatacttcc aaactcattt tactaagaca gtattaccct aatatcaaaa
39541  ccagaaaaag acaaatcaaa accagaaaaa aaaatcccaa aaatcctaaa atttatatgg
39601  aaccacaaaa gaccagaat agccaaagct atcttaagta aaaataagaa aacaggagga
39661  agcatattaa ctgccttcaa attatactac agagctgtag taaccaaaac agcatggtac
39721  tggcaaaaac agacatagac taatgaccca gaatagagag cctacaaaata aatctacaca
39781  tctatgggtga acttgttttt gacaaagatg ccaagaacat aactgggga aaagagtctc
39841  ttcaatcaat ggtgctggga aaactggata ttcataagca gaagaataaa actagatgcc
39901  tatctctcac catatacaaa aaaataaaat ccaaatgaat taaagactta aatctaagtc
39961  atcagactga aactactaca agaaaacatt gggcaaaatc ccaggcatt ggtctgggca
40021  aagatttctt gaaaaatacc ccacaagtac aggcaaccaa agaaaacatg gacaaatggg
40081  atcacatcaa gttaaaaagc ttctggacag caaaggatac aatcaacaaa gtgaggagac
40141  aaccacaga atggaagtaa atatttgcaa actaccctc tgacaaggga ctaatgtcca
40201  aaatacatga ggaactcaga caactccaca ggaaaaaaat ctaataatcc aatcaaaaat
40261  gggcaaaaaga ttttaatagt tatttctcgg aggaaaacat acaaatatca aacagacatt
40321  caaaagggtg tcaacatcat tgatcatcag agaaatgcaa atcaaaaacta caatgagata
40381  tcatctcact ccagttaaaa tgttatagac aggcaataac aaatgctgga aaggatttgg
40441  ccttgtacgc tgttggcggg aatgtaaatt agtacaacta agatgaagaa gagtttggag
40501  gttcctcaaa aaactgaaaa ttgaactacc atatgatcca tcaatccaac ttctgggtat
40561  acacctaaaa gaagcaaaaa ttgtatatgt aagatatatc tgcactctta ttttgttgc
40621  agccctattg attataggca agatttagaa gcaacctaaa tgttcatcaa cggatgaatg
40681  gaaaaataaa atgtagtaca tatacacaat ggcgtactat ttaaccatta aaaaaaatga
40741  gatcctgtca tttgcaacaa catgaatgga actggaaaat atgttaagtg aaataataaa
40801  taagccaggc ataaaaaggc caacatcaca tgttctcact tattttaga atctaaaaat
40861  caaatcaatt gatctcatgg acatagagag ttgaaagatg gttaccagag gctgggaagg
40921  ggagtagggg gagggcaagg gtgggggatgg ttaatgggta ctaaaaaata tagaaaaaaa

```



```

40981 tgaataagac aaactaatag cacaatcagg taattatagt caataataat tgtatatattt
41041 aaaataactt aatataattg gattgttttt aactcaaggg ataaatgctt gaggggatgg
41101 ataccccatc cttcatgatg tgcttatctt acgttgcatg cctgtatcaa aacacctcat
41161 gtacctcatg gatattttaca cctactacRt acccaaaaaa ttctaaaaat aacttttttt
41221 aaatattgtc atttataaca gcaccaaatt tatcaaatat ttagaaacat ttttgataac
41281 attttaaagt gtgtacactc aaaactgcaa aaattgctga gagaaaattt taaaaatacc
41341 taaatagagt gatactgtgt taatggattg gaagagctaa aaattattaa gatgttggtt
41401 ctcttcaaac tgacttttta attttttttt attatacttt aagttctagg gtacatgtgc
41461 acaatgtgca ggtttggttac atatgtacat gttggtgtgc tgcaccata aactcgtcat
41521 ttacattagg tatatctcct aatgctatgc ctccccctc cccccaccc acaacaggcc
41581 ccggtgtgtg atgttccctt tcctgtgtcc aagtgttctc tttgttcaat tcccacctat
41641 cagtgagaac atgtggtgtt tgggttttag atttaattaa atcccaataa aaataatagc
41701 aggctttact gtagaacttg gcaagctgat tcaaagttta catgtaaaca aaggacctag
41761 aatagtcaag atagctttta aaagaggaaa gtctgaacac atgcaacacc taagtttcaa
41821 gacatattat gaagctataa taatcgagag agagtggtaa tggcataaaa gcagatgtat
41881 agatcaataa aagagaaaat aaagtccaaa aatagagttt cacttacatg gtcaagatat
41941 tttcacaaag gtaccaaggg aattcagtag ggaaaataat ggcttttcaa caaatgggtc
42001 taaaattgtt agatatttac atgtaaaaaa aatgagacct gattcatata ttgtaccctt
42061 ataaaaatta actcaaaatg tatcacagaa taaatacaaa actaaaatat aagacttgta
42121 ggagaaaata tttatgaccc aggtttaagc agagatttct tagatgtaac ttgaagagaa
42181 taatccataa aattaaaaca tgaaaaaaat agttgggctt aatctatgtt aaacatttct
42241 cctccttggg agacattgat aagagaataa acaaacaagt caaagactgg aataaatatt
42301 tgaaaatcgc atattggaat tgtaaccaat taaggaattg tgaccaaata atacaaaaat
42361 ctctcaaaac acaacaaaat gaacacagag aactcaatct aaaaactggg taagaaattt
42421 aaacagttac ttcactagag aaaatacatg gatggaaaat aaatgaataa aaagatactc
42481 aatattattt ataattaggg aaataaaaatt aaaaccacaa ttagatacca ctatttttcc
42541 atcagaatgc ttaaaattaa aaagattaat caaagtgttg gcaaagctgt ggagcaactg
42601 gaactttcac acagtgttat ttgtaatgaa atatggtaca gccactttgg aaaacagttt
42661 attaatttat tcaaaagtta aacatatatc tttcctatga ctacgtatt ccactgggca
42721 tttatgcaag agagataaaa gcatatgttc aaacaaatat ttgtatatga atgttcatag
42781 cagctttatt ttaaacagct gaaacctaga agcaatccaa atgttcttca acaggtgagt
42841 ggattaaaaa aatgtggaat atttatgcaa tagaatgttt ttcaaccata taaaagaagg
42901 aactgttgac acatctaatt acctgaataa atatcaaatt attttgaata aagtgagcca
42961 ggtaaaaaag aaggcatatg attttatatt atttacataa tattctagaa aatgcaaact
43021 aatctattgt gacagaatgt ggtttgtatt tgcattgatg aagacaagaa aggggtgggga
43081 aagggatggc aaagaatcac aaggacactt ttagaagtaa taaatacact tactattttc
43141 atcatagtgg tagtttcaca gttgtgtgac atatgccaaa acatcaaatt gagcacttga
43201 aatatatgcc atttatttta tatctgttac acttccacaa gccttttaaaa gaggaagaga
43261 gagagcaaat ttgaagtgtc agagatagaa tgaaattgct ttctgcttgt ttctaccatg
43321 atgccctcat tcaataagct gggtacattt cctcatgggt ttgtaggaca tataatgaga
43381 atatatatat atatatatac acacgtataa tattatatat agactatgta tgtgttata
43441 atacatatat gtattttatac atatatacat ttaatcgtat acatataaac atttaataat
43501 acttctttta aaaggcctct gagagacccc ttgttccttc caccatgtga gggatatagca
43561 agaaggtgac atctgtgagg aagtgggccc tcaccagtca ccaaatttgt caacaccttg
43621 atcttggaat tctcagcctc cagaactgag agagtgtgtg agagagagag agagagagag
43681 agagaagtgg ttagcacatg cctccatttt attactttgt tgactgattc aaaatcatga
43741 agttgaatct ttaaactatt cgtagcctga aatgggttgt gggttttagaa tttcttaacc
43801 tcaactatcc cttcctcaga aaaactcact tggaaatttg tttaaattat taaaagtaat
43861 cccaaaggag agtggcctag tcaggtoaat catgattccc gtttctaagg caatgcatct
43921 agattcaaaa aataggagta gatattttcca acttacagtt atcttaatca ttggactgtg
43981 cccagagtct attcatagtg ctgttgcttc cagcatatat ttcactatgg atcgaactcc
44041 aattatgctt tctataattt tctttaagtg ctaacaagca atgatactca aatatgtata
44101 ttgagattct cattttcaac tgctttctga acatatgtgc caagatatct tctgaaattg
44161 aagatgcttt aaaaacattt atgacattcc ccttccaatt attatttttg ttattattga
44221 ggcagagtct cactctgtca tccaggctaa agtgcagcgg tgcgatctcg gctcactgca
44281 acttccacct cctgggctca agcagattct ctgcctcagt ctctgggta gctgggatta
44341 cagtcatgcg ccaccaaacc tgactaattt ttgtattttt agtagagacg gggttttgcc
44401 atgttgaYca ggctgggtctt aaactcctga cctgaagtga tccgcctgcc tctcttgcaa
44461 tattttattc ccgtcttact ttcctatttt ttMgtgatca ttaaaaaatcc agaagcatat
44521 attaggtaca gtgtggcaaa aaatagaaat gatcaaatac ttttgagggc Rtcaatgaaa
44581 gctttcagtg aagttggttg aactgcgcct tgcaggaaga ggaagaagaa ttctctaagt
44641 aaacagaaag ttgcatgtct atggtctgcr tgcttgtgtc tccccaaaat atacaaaata
44701 tatatgttaa aatcctgcct ccaaagggtg ttgtattaga aagtgggact tttgggaggt
44761 atttagggtc taaaggcaga ttcctaatag atgggattag cacatttata aaaagggtccc
44821 tgagaaaccc tttgtccctt ccactatgtg agtacacagc aaaaagggtg catctgtgaa
44881 gaagtgggct ctaccagac accaaatttg ccagcacctt gatcttgagc ttcccagcct
44941 ccagaactct taaatataaa tttgtgttgt ttataaacta tccaggttat ggtattttgt
45001 tatagcagct cagatgaact aagacatgca ttcaaaaaca aagaaaactg cataaaccaa
45061 tgcattgaact agaagcagtg gcatgtgcct tggggatctg caagaagttc tatatggcta
45121 ttgcacagca tagagactgt atgtagaagg aaggtagaca gacaggaaga ggggtcccaga
45181 gaggagtaat ggtatatatt tgtaatttaa aataattcRg tacagacaga gggatatatg

```

```

45241  tgtttatcta caacttaYta taaatctaca catctacacc cttgagtaat tggttaacat
45301  ttgagaggaa ttttcctaata attgcagttc cccaggaaac actcctgagt cctaagattc
45361  catgtaggag gttactgtgg agcgttctca agaaccacag gtgagagaag ggaagaaagc
45421  cctatctgat gcagtggcaa cagataagtc agctaaggaa gagagctccg gggctggaat
45481  gactcttcag agttatgtta attaaagcaa gtgggctgga ccagaccttt gtgctgtcca
45541  catcaagcaa tcattggcct ccagctgcct ccaagaggag gctggctctt tgtcctgtta
45601  tattattgag ctatgctgca gcttgggttc tccagaagac aaaaactgaa acagagttag
45661  gagtgcaggt taattttgcc atgtggcaga cactgagacc tacttaggag tgcacacatc
45721  cattagggaa tcaaactctgt gagagaaatg aggcagaagc tggcttaggc aaggggagga
45781  acagaccacc atgtggagct gacaaagtct ctcttagccc agtagggagt tccagagcaa
45841  agattattga ttacaggagt cccgtgatgg gtggaaatta ctaggccatt gtagcaccac
45901  tttgttcagt ctctggccca aggccaccat gagaagagtg ttaccttggg tcaaaaatgg
45961  aggggaagagc aaactaaaaa agccaaaagc tggaggatgt cagcgaacca cactcctcgc
46021  atctagacag taagggtctt cttgaagaaa gatctgagct gcacacctcc tatgtttacc
46081  atgtctgcct catgacttca tgatcttctt cttcttcttc cttttttttt tttttgagac
46141  ggagtttcac tcttgtcacc caggctggag tgcattgggt caatctcagc tcaactgcaac
46201  ctccacctcc cagattcaat cgattctcct gcctcaggct cccgagtagc tgggatgcct
46261  cgtgatcgtc taagatctat ggtgtagtta tgggtgctctg cccttttgtg gaatctctct
46321  gtccgggttcg tgagaacctt caaaaatatc tgttatttga ctaaccattc cttgaagttt
46381  cttccagggc tgggatttta ttctttttta gtttccctga gatattgcaa atacaaatgg
46441  caaatgaaca tataatgaag tcactatttt agatgtacaa ataccacaca cactggtacc
46501  tctgagggtta tttgaactgc tgaatagagt aacttttatg tttccaattc ttgctaattg
46561  agagagaaga ttgcctctgt gttaatgttg gattttaaaa tatatccttt ttaagcacta
46621  ttaagcatgt tttagggttac aaagtatat ttattcatct tttccattat aacagaaaaa
46681  atattataag gaaatgtctc aaacttttct ttcttacagt tcagtctcat tgaaaagaaa
46741  gatgtctaca tcattgagaa gaaaaagaag cccaatgtgg attcagcaca attaacacgg
46801  agtacttgct aaggcacaga cactgcagga ataaattgta ggctgcattt ctggtcttag
46861  gactcagtca aatgggacat acaagccatg caagccaaca gcataattga agacaagggtg
46921  ttggaanaac aatatgaaca agtttttata ggatcaaagg aaagaaagaa ttcgactgga
46981  tctgaggagt acaagaatat tccagaattg gggaaataa ataggagatc aacagaaagg
47041  ccatattgaat cagaaccagc aggcaggaag tatgaaacca tctagcagcc tgttctgtaa
47101  ggacaaaaa tcattaaata ggcaaattgc agaaagccag ggatagtatg gtttagcttt
47161  ctttaattcc tctttgttga gtttccctatt gtcttagaaa ttattcagga ggtaagacct
47221  actggtgtat ggcacagcag gaatatcagg cctattaatc Rcaatcaagt ctctaattgct
47281  tgtattaata aatcatgttt aatgtagaat aatttctgaa aataatgcca cagatcaata
47341  aataaatctc taagaaaagc tgaagtctcc agggctcatat ctgagaactt gaggccagggtg
47401  gagtttagac actctaagta gaagacaccc aggcagact tttgtggata aggacaatta
47461  tacaagttca tagccttctg aaataagctt agttctaata atctcaggaa aaacacaaaa
47521  taatttagct atactgatgg tttttggaga acaattttcc ccagatttaa aaaagatgat
47581  ggatgtggct aaatcactgt ccctaacctc tttatagaac ccagagggtc cagccttaag
47641  atttaatttc cagggttagg atgcaagaag tgacttactt ttgagttcta ccaggaagca
47701  aaatggcaca catcaaaaat aactcgtttg gcgatttcat gagtttccaa gcactttata
47761  aaatgtacag tcatcagctt ttttcttatt gcaataagaa actattttaa tgctagaaaa
47821  ttgtatattt ccagcttcaa aatgaaatat gtcacccaac agaattaaag cagtaactac
47881  agaaagagta atcaataaat aggcctcttcc tcttactacc ctagagaatg gggagatggt
47941  atttgatcaa ttgtttttct aaaatttatg actgtagaa gccaagtcta aatttatata
48001  gaaaaagttc aaggaaatga tgtaactatt ctctaagaag gtgatttaag cctctggatt
48061  acaggagggt taagatgttg cccttgtggg aatgcagtg ttttaactta gggccatcgt
48121  gaacatcaat tttccctcat gaaacaaatc accagccaac caaaacctct attacttcta
48181  tatttcctga aggactcttc cattcccaaa ttgagtgtat gaattgcagc ctcataaagg
48241  taccaccgaa atgtggcagc ctcatcttgg gacacacatt acaaaagagt ttcagccaaa
48301  atagtttgaa tcagaaagtg gtcttttgaa agtgattcag cctaatacat cactaagaag
48361  gagaaacaaa tgaggcattg gagaccttcc atccaagtg caaataggaa aagtcgttca
48421  tgtaccatgg catgtacagg aaagcagtg tgtttcaaga actaactggc aaMgactatc
48481  agattttaga acaaaagtct gcatttcatg atgccccaaa atctagttga aaacataata
48541  ttcaatattt gttacctctt tttttgtata tttatttgtt atactgaact gaattattca
48601  cttattattt gaagttagtg tcttatagga agctaggcac caaccagcag ttgctaataa
48661  tatactataa tttagtaagt aattcaattg aataaaaatt atgacaaatt taacaaacat
48721  gttaattaaa atgcatactc acgctgcagc gtcacattaa tctttgtgcc Rccagtgcct
48781  atgccatgct tagtatgcat caaatatttg agcagtacac aagtgagtag tctgagagct
48841  cccccacca aaaatatgat gattaaatac agttatgatc agatccccag agtgtggctc
48901  taaactgtat gggggccaag tttgaatact gttgtgtctt acactgttat tacctatcca
48961  gtatctattt ccccatattc cttataaata aaacctagat tttgattggg acagtaagggt
49021  gtcccactga aaactcattt ctctaaccba tgtgatgcca gtgcttgccc aaaaagaggg
49081  catcccttcg aaataaaaag gcaaagcttc ttttgctttt tatttttact tctttctgct
49141  tgatagctag gtataatatc tagttttggg gcagccatga ggataacagt tgcacattta
49201  ggatggtgga gaaagttaga aagaggctaa atccttgata acactgcaga gctattgctt
49261  ctatcattag cttaattcta ggcttctcac tgagtgagaa aaatagacta attgttgaaa
49321  ctattgcttt catttgcttg aagtcaaata tattccttct ctgtgtgtcc ttttgacaat
49381  atctttaaag ttataaatac atagaaatat cacttttcac ctttattctt ttacaagtat
49441  taccttgggt ccagaacatt gatgttagtg aacaaatggt taatgtttga aaactttcct

```


49501	gaaatcttctt	gcctctaaca	agagccagaa	ggaagactgt	tcacatattc	tttatatctt
49561	gagccagatt	gtcaattcct	ccaggcctaa	tccattactt	tgtgattatt	gattattcag
49621	tttatgaaaa	tgagtatgac	acaagttcct	tcttgcaaat	cagatgtcaa	tacctcagaa
49681	ggtccttcac	ccaaattatg	gcagccaccc	agtcattcac	aaccacggca	tcttgtttta
49741	atcttttggt	tagccctgat	aaacctctga	tacttttcta	atttacttat	gtatgtattc
49801	acgcattgtg	gcctttggtt	acttttagta	tcctccccc	agtgttagga	tatgagcaga
49861	gaatctgtct	gctttatcta	gaaatatatc	cttggtctat	aggagacaag	taggcattat
49921	tgttgaaatg	ctgaatgact	gaatcagtaa	gtatgagaat	caaagaattg	ttagatatag
49981	tcactgacct	gaggaaattt	caaagacaaa	taaggaaatg	agagacttac	tagaaaaat
50041	gaaaaaatga	agttataaga	atgcttttaa	aaaaaggcca	agtgtggtgg	ctcacatctg
50101	taatcccagc	actttgggag	gccaaggcag	gaggatcatt	tgaggtcagg	agtttgagac
50161	cagcctggcc	aacctggcga	aaccccatat	ctactaaaaa	tacaaaaatt	agccagacgt
50221	ggttgtgggt	gcctgtaatc	ccagctactc	aggagtctga	gacaggagaa	ctgcttgaac
50281	ccaggagggt	gaggttgacg	tgagccaaga	tcgtaccact	gcactccagc	ctgggcaaca
50341	agcaagactc	tgtctctaaa	aacccaaaaa	aggatattaa	aaggacagag	gtacagtcag
50401	aacccaatga	agataagcca	caacttggtg	tttttagtag	ctcagaggac	caagactttc
50461	atatggattc	aggcagcaga	gagagcaaa	ccatagtga	aggaggagg	ctggagcaaa
50521	gcattgttga	gcataacata	tctgtgagtt	taaccagtaa	aaaaggcttg	gtgtctcttt
50581	gagaacattt	gtgatgtggt	tggaaaaatg	ggagactctg	ctcaaagatt	gtggtttttag
50641	gattggctat	gctgagttat	taggtgagtg	caaaagta	tgcagttttt	gcattgttgg
50701	aatttgccat	ttgatattgg	aataactctt	taaataaatg	tgcttatgtt	atacatcatt
50761	taatgggcac	ttctcacttt	ctattttttt	actaatgaca	ttacttgctg	tttattttgt
50821	gtttattttt	gacaacggaa	acaatgttag	ataaaaagca	aattctagcg	actttcttat
50881	ttgagttcaa	aatgggtcgt	aaagtaagca	gcaaagacaa	ttcacatcat	taacaaagca
50941	tttggtccag	gaactgctaa	cgaacgtaca	gtgcagtggg	ggttcaagaa	gttttgcaaa
51001	ggagacgaga	gccttgaaga	tgaggagcgt	agtggccggc	catcagaagt	tgacagtgc
51061	caattgagag	caatcatcaa	agctgatgct	cttacaactg	catgaaaagt	tgctgaagga
51121	gtcaatgtcg	accattctac	ggttgttcag	catttgaaag	aaatcagaaa	gggtgaaaag
51181	ctcgataagt	gggtgtctga	taagctgacc	aaaaatgaaa	aaaattgtcg	ttttgaagtg
51241	tcctcttctc	ttattctaca	caacaataac	gaaccatttc	tcagttggat	tctgatgtgc
51301	aaggaaaagt	agatgttata	tgataaatgg	caatgaccag	ctcagtggtt	gggccgagaa
51361	gacactccaa	ggcacttccc	aaagccaaac	ttgcaccaat	aaagggtcatg	gtcactgttt
51421	gatggctctg	tgccgggtctg	attcactaca	gctttctgaa	tcccagtaaa	accattactt
51481	ctgagaagta	cgctcagcgc	atcaatgaga	tgacacaaaa	actgcaacac	ctgcagttgg
51541	cattagtcaa	cagaaagggc	ccaattctct	acaacagcca	actgcacgtc	acaccaccaa
51601	tacttcaaaa	gttgaacaaa	ttgaggtggg	aagtttttgc	tttatccacc	atattcacct
51661	gaccccttgc	caaccaacta	ccacttcttc	aagcatctca	acaacttttt	gcagggaaaa
51721	tgcttccaca	accagcagga	tgacagaaa	gctttccaag	ggttcgtcgg	atcccaaagc
51781	atggattttt	atgctacagg	aataaaca	cttattttct	cttggcaaaa	ctgtgttgat
51841	tgtagtgggt	cctattttga	ttaataaaga	tgtatttgag	cctacttata	atgaattaaa
51901	attcacagtt	caaaactgca	attactttta	caccaaccta	atagtttata	cctagctttg
51961	ctgagcctca	agttccttat	ttgataaatg	gggatgagaa	tgcttacctc	actgaattgt
52021	aatcaggatt	aaaagagaca	gtatgaaagc	aatttgagaa	gcatgagtaa	ttatgaaaat
52081	ggctaacagc	tcttgagttc	ttattatgtg	tcaggcactg	gagtcacac	ttcacacaga
52141	tgatctcttt	taatcctcag	aacaacccag	aggaaaagac	aatatccagg	tttcaacgtc
52201	aaaggagag	agccagctag	gagcagaact	gggctggggg	ggggtttggg	gtttgggtga
52261	tggaagaaca	gctcttgagg	aaacattcct	ttctttgacc	acctcatcta	acaattgctc
52321	tgatgatcca	cagttccacg	acttattttc	cacttaaact	aggaggatga	tatccaaacg
52381	tggtccaccg	gtgagacata	tatatacatc	ccattttcac	caagcatcca	aggatctact
52441	ttggcaaaa	acattcaaca	acttgggggt	attctgtaac	ttccttgagg	aggaaagtga
52501	gcctcttcaa	atttactttt	tgcatccaat	tgttcacaag	ccaagtgtat	ttttaaagat
52561	acatttcttt	aactgccatc	acatgcaaat	ttctaaggaa	attagaatgc	tgccaaacat
52621	cttccagaaa	tggaggtagt	aactcctgca	cagaaagaac	atgtaccata	agttagaaaa
52681	tcctgaatag	aattccaaat	attccagtc	tgattttacc	aagcagaatg	gcataagaat
52741	taggagcata	gtctccaggc	tgacaaatct	gtttactgcc	tggtgtgcac	atattgttct
52801	gtaaaacttg	ggatgtttat	ttattcacca	tgtaaaatca	tttttctcaa	gtgtaaaatg
52861	gaaacaaaaa	aacgtattac	tccagtgc	ctgtgacaa	taaatgagat	gatataatg
52921	aagcaaaagg	ttgtgtgggt	ctcaggggca	gtactgaaaa	tggtaaaatt	ttttcttttt
52981	actactaatt	tgttaagtct	ttcagatttc	tcacttggtg	ctttagctat	ctttattatg
53041	tgctactcat	gacaaaattt	agggtttgat	gtaatttaag	tattggaaaa	tacaataagc
53101	atattacctc	tttgataatt	atccttttag	cacaagttag	cattcagtc	agccaaaatt
53161	acataatgct	aaatgctgaa	attagtttac	ataaaaagtt	gtgggcccgg	cgcagtggtc
53221	cacccttgta	atccaagcac	tttgggaggc	cagagtgggc	ggatcaccag	atcaggagat
53281	cgagaccatc	ctggctaaca	cggtgaaact	ccaactctac	taaaaataca	aaaaatttag
53341	caggcgagggt	ggcgggccc	tgtagcccca	gctgctaggg	aggctggggc	aggagaatgg
53401	cgtgaacccg	ggaggcggag	cttgagtgga	gctgagatcg	tgccactgca	ctagagcctg
53461	ggcgacagag	ctagactcca	tctcaaaaaa	aaaaaaaatt	agtgttctgc	agactctgtg
53521	atatttgtgg	tttagtatca	gttctcaaaa	tggagatagt	acatgtgata	tcaccacaga
53581	aactccagcc	aaacctacta	tttaatacta	aatagtaaaa	tagtcaatat	gtacactcag
53641	tacattttaca	tagttctaat	cagcatggga	tcattaagtg	ttgatgttct	gttattcttt
53701	atggagattt	tgttttagtt	ctcaagaagg	atcttcaaaa	tcacttaagg	gattcattta

53761	ctcatgtttc	tgaatcaata	tatgccaaaa	gattttctct	ctttaccaga	aaatttacat
53821	aatatattat	tcctctaatt	tgtgattctc	tatgcctgtg	ggaaaatata	aaagaaatct
53881	taatataatt	gttattctat	ggaaatgata	ttcatgtaca	tttcttgtgc	ttccctatgc
53941	gtaattttta	gagtgggaatt	ggccccttat	ttaaactctg	agattttattt	gctctctctt
54001	aaagagacag	aagactccta	attggaaata	aaaattgtag	cctagatact	tattcaaata
54061	tttaatagga	cctgcgttgt	taagttcgaa	atttcactcc	agcattacca	gtgaatttta
54121	tattttattc	tatttagaat	ctatgttgtt	atattttttg	tagttgtaat	catgcctgtt
54181	tccccagcta	gaatgcaaac	tcttttgagt	ttggaccatt	taattaagct	ttggaacatt
54241	cacccccaac	tcacagggtca	tctgtaacat	aacagatctc	gccgtccact	taaagtgggt
54301	gaatgaactt	cgtaggggggt	aaattatgcc	tcaagaagg	tgggattaca	ggcctcagcc
54361	accacaccag	gcctttgttg	tcgtatttga	ttgttccttc	catgtgcttg	aggctccact
54421	ggctctctgg	gtcattgtct	gcgtctttac	tcattttatg	ccagagaagg	taaagagaga
54481	tatctggtaa	atttggaata	aaattatctg	ggcctgtgta	ttagttcatt	ctcacactgc
54541	tgtaaagaaa	tacttgagac	tgggtaattg	ataaagaaaa	gaggtttaat	ggctcacggg
54601	tctgcaggct	gtacaggaag	catagcagct	tctgcttccg	gggaggcctc	agggagcttt
54661	tactcatggc	ggaaggcaaa	gcgagagcat	ggctggagca	ggaggaggag	agagagagtg
54721	gggagggtgct	acaccctttg	tttttgagac	ggaatttcga	agtttcactc	ttttcccagg
54781	ctggaggggca	atggcgctat	ctcggtcac	tacaacctct	gcctcccagc	ttcaagtgat
54841	tctcctacct	cagcctcccc	agtagctggg	attacaggcc	cccaccacca	cgctgggcta
54901	atttttgtat	ttttagtaga	gatgggggtt	caccatgttg	gctaggctgg	tctcaaactg
54961	ctgacctcag	gagatccatc	cacctcagcc	tcccaaagtg	ctgggattac	tggcgtgagt
55021	acacactttt	aaacaagcag	atctcttgag	aactccatca	tgagaacagc	actaggggga
55081	tggtgctaaa	ccattcctga	gggaccaccc	ccaggaccca	atcacctccc	accaggcccc
55141	atttccaata	ttggggatta	caattcaaca	tgagattttg	acaggcacag	agatccaaac
55201	catgtcagcc	tagttctact	aatcctgccc	ttcttttatt	ggaattctcc	aggctctctgc
55261	tgctctctgc	agcgaggaaa	gacctgttct	aYaataatcc	agcactgcag	gctggactaa
55321	tcactcttcc	aacacgtggg	tcacttagca	agcctatttg	gcctcacaca	tcctacactt
55381	agctcttact	agtaactgaa	atggcacttt	gccttctgct	tgccactcct	tattttttcac
55441	aaatgttcac	aaatccagg	gaagaaaaga	ggtgctcttt	ggtgagcttc	cttggaacaa
55501	ctgattctat	acttttattt	ctcatcttgg	taattcttat	ggtgtggagg	ttcatgtacc
55561	ttcagagttt	atatgctgaa	atcctaacc	ccagggtgat	gatgtaagga	ggaggggtct
55621	ttggaagggtg	atgagatcat	gggagtaaat	ttctgtcttt	aaaagctatc	agtttatggc
55681	attttggtat	agcttcccaa	ataatgaaac	ccaatagcta	ctgtgaatta	agtagtatac
55741	ttaacctcca	ttttattcca	ataaatgtaa	tcatttgact	cccttctatt	aagccctcac
55801	ctctacgtgc	acattttatc	tctccccatt	acctctcacc	ttccatcagt	agcgtctcta
55861	atttttacatt	ataatgccta	ttaacgttta	tgttctgttc	tataatcata	attaaatatt
55921	tatgctatct	ctgtggagg	attctaagag	ctgaaaacta	gtaaacagca	gttacagtat
55981	aatgactaca	taaatattca	atgaaggggc	aactcacgtg	ctactattct	atctccttca
56041	ctttattccc	atatcaccca	ctcccatagc	aatcaacgtg	taatgatcct	aagcatcctg
56101	gtcaaagtat	tctccataat	tatacttcaa	tatttgctca	aaatcatgcc	ttatttaatg
56161	tatctcacac	ttggacacta	actttataga	cagggttagc	tggtattttt	cctagagttc
56221	atatttgtct	tccaggcatt	tgtattttatc	cttactgaga	gaagaagcat	attatttctt
56281	cactgtgtca	ctactgtaaa	cctgctcatt	tgtcattcga	tttattaatt	ggaatgccca
56341	ttcatctttc	tgagaacctc	cttgacgctt	actaacttca	agttccaatt	tcccatttgt
56401	tactttctgg	gcccactgtc	cacttggtat	gctgagattt	cttttgactg	acttcctagg
56461	tcagctcagc	tgggttttYt	accttggtat	ctctgccact	caaacactgt	catttgatca
56521	gtctctatgc	atttaccaag	tatttactat	gtacaaggca	tagtattata	tactatgaaa
56581	attcaaggca	aatcaaagtt	tgttctgcac	caaaagagtt	aatagggttaa	gtcttgaaca
56641	cacatataaa	taatcataac	ataaaaacta	caaggaagat	aacagagaaa	tagaatttga
56701	caaagaaatt	agaatgaaag	aaatagaaat	atgccataga	tgaaaaMttt	aggagagcat
56761	cagatgtgaa	ggggtgaaag	ggagatagg	catgggtgaga	gagagtcaag	gaagggtcaga
56821	gaatgcatga	gaaagaaaga	agcaatctca	ccttggttaag	caacggttgt	gcaaaaacat
56881	agacactttc	atagtgaaca	aaatgttaca	ctgctattct	acatagtatt	ggaagatctg
56941	gccaggggcaa	tcaggcaaga	gaaagaaata	aagggtattc	gaataggaag	ataggaagtc
57001	aaattatctc	tgtttgcaga	ttacatgatt	gtatattttag	aaaaccccat	tgtcttagcc
57061	caaaaacttg	ttaagctgag	aagaaacttc	agctaagtct	caggatacaa	aatcaatgtg
57121	caaaaatcac	aagcattcct	atacgccaat	aatagacaaa	cagccaaatc	atgagcaaac
57181	tcccattcac	aattgctaca	aagagaataa	aatacctagg	aatacaactt	gcaagggatg
57241	tgaaggacct	cttcaaggac	aactacaaac	cattgcttag	ggaagtaaga	gaggacacaa
57301	acaaatggaa	gaacattcca	tgtctatgga	taggaagaat	caatatcggg	aaaatggcca
57361	tgctgcccga	agtaattttat	agattaaatg	ctattttccat	caagctacca	ttgactttct
57421	tcagagaatt	agaaaaaaaa	aaaactactt	tgaatttcat	atggaacaac	aacaaaaaaa
57481	agagctcgta	cagccaagac	aatcctaagc	aaaaagaaca	aagctggagg	catcacacta
57541	cctgacttcc	aaccaaaga	gcatgggtact	ggtacaaaaa	cagatatata	gaccaatgga
57601	atagaacaga	ggtctcagaa	ataacaccac	acatctacaa	ccatctgatc	tttgacaaac
57661	ctgacaaaaa	caaacaatgg	ggaaacaatt	ccctattttaa	taaatgggtg	tgggaaaact
57721	ggctagccgt	attcagaaaa	ctgaaactgg	acccttctct	tacaccttat	acgaaaatta
57781	attcaagatg	gattaaagat	ttaaacataa	gacctaaaac	cataaaaacc	ctagaagaaa
57841	acctggggcaa	taccattcag	gacataggca	tgggcaagga	cttcatgact	aaaacaccaa
57901	aagcaattgc	aacaaaagca	aaaattgaca	aatacaatct	aattaaagag	cttctggaca
57961	gcaaaaagaaa	ctatcatcag	agtgaacagg	caagctacag	aatgggagaa	aatttttgca

```

58021 atgcatcttt ctgacaaagg gctaatatct agaacctaca aggaacttaa acaagtttag
58081 aagaaaaaaa caaacaaccc catcaaaaag tgggtgaagg atatgagcag acacttttca
58141 aaagaagaca tttatgtgac caacaaacac ttgaaaaaaa gctcatcatc actggtcatt
58201 aaagaaatgc aaatcaaaac cacagtgaga tatcatctca tgccagttag aatggcaatc
58261 attaaaaagt caggaaacaa cagatgctgg agaggatgtg gagaaatagg aacactttta
58321 cactgttggg gggagtgtaa attagttcaa ccattgtgga acacagtgtg gcgattcctc
58381 aaggatctag agctagaaat accatttgac ccagcaatcc cactactggg tatataacca
58441 aaggattata aatcatttcta ctataaagac acatgcacac gtatgtttat tgcggcactg
58501 ttcacaatag caaagacttg gaaccaaccc agatgcccat cagtgttaga ctggataaag
58561 aaaatgtggc aggtatacat cgtggaatgc tatgcagcca taaaaaagaa tgagtctgtg
58621 tcctttgcag gaacacgagt gaagctggaa accatcattc tcagcaaact aacacaggaa
58681 cagaaaataa aacaccgcat gttctcactc acaagtgaga gttgaacaat gagaacatat
58741 gggcacaggg aggggaacat cacacactgg agcccgctcag ggggtggggg ccaaggggag
58801 ggatagcatt aggagaaata cctaattgtag atgacagggt gatgggtgta gcaaaccatt
58861 atggcacatg tatacctatg taacaaacct gcacattctg cacatgtatc ctagaactta
58921 aagtattata ataataataa aaaaatccct ttgccttctg ccatgattgt gaggcctccc
58981 cagacatgtg gaattgtaag tccattaaac ttctttttct ttataaatta aaaaaaagt
59041 tacagtactc ttagtctaaa gagaaactaa aaccaatttc atccatttag aaaataacaa
59101 aactgaatat tgaaacccat gggacactgc caagatcatt ctcagaagaa aatccatagc
59161 aataaatgtt gtattattac ggagcaataa aacctgggag aaaaaaatga actaagcact
59221 aaccacaagc acactgaaaa atatctaaaa aataaatctg atctgtgaga catataaatt
59281 gatgaatata aacttttaat ataattgagtt agacatctaa ttaaaaagtt gaattcaaac
59341 ataaaaccaa gagtggtttt ttaggaaagt taatggaata gatagatttt gtggcacttt
59401 ttttttaaga acaagaaaag tcattatatg gtgaaagata cagttactat aacacatata
59461 atattataag aaagtagtgt atataaatat cacatagaaa acttgaaacc tcgataaaat
59521 gattgaattg tttgatatta tatattatta aagttgctta tatatcagaa taaactaata
59581 actacaaaat aaatgttttt agtgtcaagg aacaccctct gcccctccaa aaagggcaag
59641 aaattcaagt atttctatat aaagaatatt gctttaaatg tcttaggatt caggtaatga
59701 tgatgcagac agaagagggt cagactaatc taacttccta ctaaaaccca aaatctaaaa
59761 taaaaaatac agataaatca aatctaattg agcaggaggc ctgttaaatt ttattctaag
59821 aatgaaattt atttatttga cagggataat aaaaggagaa agggagataa aggaatacaa
59881 gatgattatc tggatgttaa tttgggatac ataattgaaga gtaacattat tcattgagat
59941 aagaaagaca gcttcgtgta gattgaaata tgttgcttga atttagatat aaagtttggg
60001 atatataatc aaatttgagg atataattac agtataaatc cgagagtcac aagcattagc
60061 aaaatcaact agagagagcc ttcagaatcc taacagaaca gaataagata attaacctta
60121 ccaaacatat tttgaatatt gcattaacca tctattgcta tatatataga caaattacct
60181 caaaattcat tcagcagttt aaaactcaag aataaactat aattattcct tgcatagttt
60241 ctgaggggtc ggcacctggg agaactcttag ctgtgctatt ttggcccaga ttctctcatg
60301 atattgcagc caggttgttg gccaggactg ctttagccat cgcaaataat ttccggggcc
60361 agggatatcta cttccaagct cactcgtggc ttttcttgca ggcttcagtt cctcaccaaa
60421 tggacctcgt catagtgccg ctcacaaaat ttaagtgtgt tatccccagc ataaaggaaac
60481 taagagaagg tgagagagat atacacaaag tggaaagtaa atcttataac ctaattattg
60541 aagtgatacc caatcatttc ttctatatcc tatttcttag aggcaagtta ctaaattcag
60601 ccactcaacc agtaggaaaK ttaagctctt actgctcaaa aagagtatca acaaatatgc
60661 caacgtatct ttaaaaccct cacaaatMcc aaccacttgg aagagctaag aatttgtgat
60721 gagaaccaag acaaaactat taggaatcta cataaacatg aaggcgtag tgatgtcctg
60781 gaagtcagtt gatttgaatg agccactgtg tgttaagata gtggaaagaa ctattatttt
60841 ctgagtgcc actatatacc tggcactgta ctagggtgtg tatgcgaatc atctcttttt
60901 cttgccatta ataacaacca tgtacttcca gtgccttcac cacctggaat cccaagggtc
60961 ctgaatcaga taggataaat tttgggtttt aaggacagag tctcaagata gtaggaatta
61021 aaacacaatg gaacttatct ttctcacaca taaaaatMtg gaagtaggca gactaacgta
61081 atgggagcag tggctctgct ccatgaaatc ttggggcatt ccagcccaYg tttccatcat
61141 tgatagccca cagtgtcatg atgcagaaca cgtctagagc tccatctttc aagaagcaca
61201 atggagggaa gattaagacg aaaggagcaa aggacagggt ccagctgtct ttaggaggc
61261 tcaacaggaa attaccaaac acttctactt acctgtcaca acttttccat ggactgagag
61321 atttctttac tctggtagta ataaagccca gataaaattc aggggcttta ttactatgga
61381 agaatagata tatgggggta aatagtagtc tttatgacag tatcatatgg aattaccaga
61441 agcattctaa agtacaggac ctctgaaaaa attattagcc ttttgattcc tccaggcatt
61501 gtgaaatctg ttagtttctc aagctcaagt ccttggacta attttgacca agttttatat
61561 agtttatatt cttagtYgaa gtacacaatt ctatttcatt tctaccctaa cagctcacat
61621 tatcatgaat gagaagaaat gtgcacctgt attttaaaat tttttgccc aatttagcagt
61681 cttgggtctc agatgtccca tctagtaata atatcttctt attggctttt gctattttgt
61741 gggctagaga aaccacttgg aaggaccata aaagtcccca gttttatgtt ggtactaaat
61801 atattctttg catccattaa tgtcctcacc aaatttttta tcatcaatac aatgtacaaa
61861 attatgtatg gtgtgattat ctgtgatgtt ctcaaactcc acaaataatt attagtaaac
61921 aaggactaga gccaggttg gagaattgta attatttatt Rctaataattc ttagacaaaa
61981 gggaatgcc tttttcacta ctcacacata aaaaaatgca gtatataagt aaatgttta
62041 gcgctgtcca aaaaccacta tgagttttgg ggctcagaaa attatacccc aaagtgaagg
62101 cctcagaagt agactcagaa gcaaagtttc tctgaacttc tgcccgctg tctctcgac
62161 ctcatcttc ccccaatgc aagtcataga aacttgaatt ctcccttcc aaggtgggtc
62221 atagaaaccg aaccctttt ccccaaagcc agccataaaa cctgaaaaca ttaccctaac

```



```

62281 cttccccctc ctttctgtgt aaaagatggc cataaagaaa ttctctgacc tgacttgttt
62341 gactgtaggt cgtaagaccc cctgagtcca gaaaacactt catatcccgg aggaaggaat
62401 gctgtactga gaggccaaga agcatctgaa cagacagacc atgctgagtt tccccaat
62461 gtctattccc atcagggtcat acccttttgt ccaaccatat ttctacacgg tttttcattc
62521 ttcacaaat ctaagcataa aaatagacag ttgtcactgt atcttttgagt ctccattttt
62581 aaggctccca tgacacataa aactataatt aaataaattt gttatgcttt tctcttggt
62641 atttgtcttt tgttatagga gtgtcagctg tgacccttat gatagggagg aaagggatca
62701 cctcctttgt gcccctacaa gagaaaaaca caggtaaag taggctgaga gcataattct
62761 gactcttaag ctcagactta tggttaccac caattctatt tgttccatt tttaaacca
62821 tctcaaaaat attttatcct cactgagcct cagaaagatt aaatatcatg tccacactta
62881 cataccta ataaaccagg attgggattg taaattcatg tcttcttaac gtcaaaacac
62941 atcttcatat tgtttccaac acaaggagac ttgaatgcaa ttactttttt tttctgtttt
63001 ctttgggtata tataatttaa gagcattgtc attgatctta ggtgtatttt ttcttataaa
63061 gtatttggtta aatttctatt tattgacatt tgaataaatt gatgccaag tattgcattc
63121 aacatttgct ttaaaaagta tattgtttgt tgttgtttgg tcatttttaa atgtaattgc
63181 aacatattaa aatggggatt atctagataa ttaactggaa tctctgtaat gtgacatacg
63241 tgtgtcccca catatagcta tctcattc caagaagag agggaaatta ggacactgaa
63301 ttattctgcc agctgactcc gcatcccttg gtgactgata attttctata Mgttgactt
63361 ggcagtgtca gcaagtaagg attaatatcat ttaatcctc cctgatttgg tctttttttt
63421 tttttgtagc ttaactattt tccagtcttc aagactttct attgtctatg gttaatttaa
63481 acaaatcata ttttcacaga tcttatggat ctttctagag tttttttaag tgtctcactg
63541 tagtttattt tcaaatatat tttaacatgg tgacagtctc ttcacttgtc tttcccttcc
63601 attgcatttg cttccaggct aatctcctga agtacaattt gatcatgttt tccgatataa
63661 cgttgaaaga gctgtaagtc atatcagacc ttttagtaat ctatacagtt ccagaatcat
63721 taaggcaagt gagttagaaa aaaacatttt caatgggata tttatgtttc atgactttag
63781 agagaatttt aaaacaagaa aatttctact tttatcaaac cctctcaata ttgtttttta
63841 tctcatagat aacttttccac ttattttaa tcaattttta aattttatta ttttcatagg
63901 aatttttaga gtactgtaga acacaYtgaa gttcctgact tctttttaca ggtgtaatta
63961 ctgagattta ggttctatgg ttggcccaag tttcataaat aataaatgga aaataaggac
64021 ctaaagccta tagagtccaa tttctatgta cagaatctct ctgtaatctt tgtcctcttt
64081 gtacacatta agggatcagg agatgctaag attgctaaat acacagtagt tttctaatat
64141 aaataatgat tagatataca tagaaatatt ttaagcaat tcagatcctg ccaatctctc
64201 ctactccctg ttgctaccat ctaagatata tctactgcct ttgaatctgt cagagtgaga
64261 ctcagcaatt cataactagg gcactctgag acagctggaa cttccctaga gaaccagctc
64321 gatccactga accattggca agatgaattt tctacagca tcatacgta gtgttattcg
64381 tgttcccaac cccacatccc taggccaggg gtcataattt taaatgcccc tgtttatcta
64441 ataattgtat ataaacttga aatttgctaa gtatagatct taagtgttct caccacacat
64501 acacacacaa aagtgtaaat atgtgtgata tgctgtatta gcctgttttt acgctgctga
64561 taaagacata cctgagatgg caatttgcaa aagaaagagg tttaatggac tcacagttcc
64621 acgtggctaa ggaggcctca caataatggc agaagggtgaa aggcacttct cacatgggtg
64681 cagacaagag aagagagctt gtgcaaggga acccctcttt ataaaacat cagatctcat
64741 gaggttatt cactattaca agaacagcac aggaagacc tgcccccatg attcaattac
64801 ctcccactgg gtccctccca tgacatgtgg gaattgtgga agccacaatt caaggtgaca
64861 tttgggtggg gacagagcca agccatatca ttcaccctg cccctccca aatttcatgt
64921 ccttacattt caaaattaat catgccttcc cactctccc taaagtctta actcatttca
64981 aactaactc aaaaaccag aatccaaagt cttatttgag acaaggcaac tcccttccac
65041 ctatgagcct gtaaaatcaa aagaaagcta attacttctt agatatataa tatctatata
65101 tctatataga tacataatat ctatatatct gtatagatac ataatatcta tatatctgta
65161 tagatacata atattctatat atctgtatag atacataata tctatatatc tgtatagata
65221 cataatatct atatatctgt atagatacat aatatctata tatctgtata gatacataat
65281 atctatatat ctgtatagat acataatatt tatatatctg tatagataca taatatctat
65341 atattctgtat agatacataa tatctatata tctgtataga tacataatat ctatatatct
65401 gtatagatac ataatatcta tatatctgta tagatacata atatctatat atctgtatag
65461 atacataata tctatatatc tgtatagata cataatatct atatatctgt atagatacat
65521 aatatctata tatctgtata gatacataat atctatatat ctgtatagat acataatata
65581 taatttataa attatatatt atatttaatt aaattataat ttaattataa ttttaattaaa
65641 tataatatat aatttataaa ttatatatta taaattatca cctgataaatt tataaagcca
65701 tcagatctca tgagactttt tcaactattac aacaacagca tgggaaagac ctgccccac
65761 gattcaatta cctcccactg ggtccctccc ataacacRtc agaattgtgg gagttacaat
65821 tcaagggtgac atttggtggg ggatacagcc aaaccatatc acatgttaat tagcttgatt
65881 cttataatta tttcactata catatacata gtgaatatat atatatatgt atacacacac
65941 acacacaaac acacacaatt ttatctgaat catacctcaa taaagctgga aaatagatcc
66001 caaccaaggg ccagggtatag aagcatgtgc ttataacaat aaMRtttcta aaagaaatag
66061 ccccgcttag gttaaattgta ccaatttctc taatacccca aaaattcaga tttttgtgtt
66121 aaaaatcctg attttttaata ttggtaaaac ttttaataac atagataagc aattatatgt
66181 ctttatggat ataggggtccc atgggtctata gcttacaata tgtggtctca atctcagata
66241 ttctaYagtc ttcagagtct ctcatgttta gacctgaatc atgtctccag tttctctaaa
66301 attgagttag tttaagaYgt gatcccaaag ctcaccctag gttgccaggg accagggtcc
66361 aatagggtgaa tgtagagttc tacggatgag ggagctgttt gatttatgca tactcatgtc
66421 agtattttga ttatgccaaa tctgaattca gtagtttggt atacattcgc aagaaaaaat
66481 gaaactcata tgaaagattt gtcaattata aagcctcaaa agtggggcat aattaatcca

```


66541	tgtttagKgct	tttggattttg	tttcatttctg	gaataaggta	taacacatgt	tgtcttggag
66601	atTTTTcttt	tcctttcaaa	cataaaagta	aagttgggtat	tggttttagta	atagcacaga
66661	cacttaaaaa	gttaggccttt	tattattctt	tttgtgagtt	taaaatagga	aattctcagt
66721	ccaaaaaaat	gggcatcatc	tcttctgcca	agtacaaact	gtttggtaga	ttgatatatg
66781	atagctcaat	acagagaagc	aaaccagtct	cttccctaaa	tctgtgtgat	cagagggtga
66841	acctaaatca	ccacctctgt	tatttgccag	atatcagcac	aatggcacia	tggacatttc
66901	acacatacca	tgaacccaag	ctcattgcaa	ttatttacta	tcaaatgacc	attacatatg
66961	tttccaaaga	tccgttccca	aaatatgttt	ttcataaact	agtctccaat	tatatacatg
67021	ttactttcta	gttattttttt	ccattttttta	tttttgattt	ttgtgtgtac	atagtagggt
67081	tatacatttt	tgaggcacat	gtgatgttct	gatacaggca	tgcaatgtga	aataatcgca
67141	ttatggagac	tgtgggtattc	atccccctcat	gcattttacc	tttgtgctac	aaacaattaa
67201	attacactct	ttttgttatt	tttaaagtga	caattaagtt	actattgatt	atagtcagtg
67261	tgttgtgcta	tcaaacagta	tgtcttattc	gttcttttcta	atTTTTtgta	ccactaacia
67321	actccacttc	cctctcaatc	tcccactact	ttttccagcc	tctggtaatg	atccttctgc
67381	tccctgtgtc	tatgagttca	attgttttga	tttttagatc	ccacaaataa	gtgagaacat
67441	gcaacgtttg	tctttctgtg	cctggattat	ttcatttaac	ataatgatct	tcagttccat
67501	ccatgtgtct	agttacttta	ataaacacaa	acaccaacac	aaagaagcaa	atggaaaaca
67561	tcagtacaaa	taatcttccc	tggccttcat	aatacactca	aacactgatg	aaagccagat
67621	agcttttttc	catataattc	aaaataagaa	gtaaaagaca	tttttaaatg	aaactaaata
67681	tatgcatttt	tttttcaaaa	ttttacttgt	cagtctcttc	tcaataacta	gaatgtaaata
67741	ttcctaaatg	tttttcttta	tgatagcatc	ctctaaaata	ttttgcctat	cgcagaagtt
67801	caacaaagat	ttgtgaattg	atcagtcatt	aggtctaaca	ggataaataa	ctctgactta
67861	aagccaattt	aagccctaag	gcaatatggg	ttttgggttca	ttacaaaagc	tttttcaaaa
67921	aatgcatgca	aactctttct	aaaaaatttt	ctaatttgac	atatccagag	gggcaccatc
67981	cttttgccat	ggatttttatg	ccaatgtgtc	ttcctgaagt	ggacaatgat	ttatacttca
68041	catatctaca	agttttcaaa	tagctataga	ttctcaagac	aaggtctgaa	agaagaatat
68101	aatcagttta	aaaatgttca	aaatttagaa	gataaaataa	aagctccaga	ggataaagag
68161	atcaaaagta	agaagggtaa	attgcttata	gtcgaacaat	taaagaaagg	ggctgttaaa
68221	aagtttggtg	cacaggccgg	gtgcgatggc	tgactcctgt	aatctcagca	ccttgagagg
68281	ccatgggtggg	ccgatcacct	gaggtcaaga	gttcaagacc	aggctggcaa	aaccccatct
68341	ctactaaaaa	tacaaaaatt	agcagggtgt	ggtggcatgt	gtctgtaatc	ctagctactt
68401	gggaagctga	ggcaggagaa	tccgttggac	ccaggaggca	aaggttacag	tgagccaagg
68461	tcatgccatt	gcactccagc	ctgggtgaca	aagcaagact	ctgtctcaaa	aaaaagaaaa
68521	aaaatgtttg	tttcacagag	gtcaccatgc	aagaagattg	ggaggagggtc	agggttgaaa
68581	ggaataacac	atcagctagg	acagcacgtt	aagtaagggt	tccacatatg	tggttaagctc
68641	actcaggatg	gtggcagcat	tgaacttaga	gatgataatt	gtgaaccatg	tgcaccttcc
68701	ataaatgaag	ggaaaatacc	aataacttga	tagatggcat	ctaataaggg	cacagaagca
68761	tgaaagagat	gttgagtacg	ctgcagactc	cagtctcttg	gctaaatgat	gtcttctaag
68821	cagtgatgtt	aaggctggaa	gatctaaaga	gtgttcaaa	aatagattga	taacataaat
68881	gagttaactt	cagagagtgc	aagaattaga	aggtggagag	agagaaacta	gagatggggg
68941	cagggattat	atgcagtaaa	gaggaagaag	tgaggggggtc	gatgaagaac	aagatggaac
69001	acctaagcc	tcagacaagt	gaagtgaatt	atTTTtatacc	atgaaggtaa	ttcagaacag
69061	aatccataca	aaaatgcacg	ttttctgctt	tcttaggccc	aactgttttt	ggccaaatat
69121	atagcaaagt	tggtgggtgga	aaagcgatag	tctcagaaaa	ttaagctaata	aattgctttg
69181	ttatgggtgg	tgattttttaa	tgtgagatta	aagtaaaatc	caaaatatac	ttaagtatta
69241	agatttatgta	actagaaata	tttcttcttc	tcttataatc	taaactctta	aacaatttca
69301	gcatctgact	acagcctgaa	taaatgccaa	tggaaacataa	acaaattaac	aaagagtaac
69361	tgggaaatgt	caacattccc	agatgctgat	ggtcagacta	atgacgcaa	ttaagaaaat
69421	tgatcttgaa	aataaaacag	atgtcctaata	acagagtggg	agcacaattc	atgaagattt
69481	ggagcgccag	gagtagagga	agggaaatgg	acagttaagt	aagtgttttg	tgagtccatc
69541	cagcctcaca	taattcagtg	tagataaagt	gcgatgtgct	aagaattaga	atggaaatgt
69601	acagaaaatg	ttaacaggac	agaggagaag	gagctcccaa	ctctgcactg	aggagacaga
69661	agaagagttg	attcaacaga	tatttattgc	acacctatta	taaccaggta	ccatgctggg
69721	cactagtga	cagtgaagca	tagattcaaa	acttctctgc	tttgtgagct	gacattctat
69781	aaggagagata	cagagaaaat	atataatatg	tcacatggta	acaagtaata	tgcagaataa
69841	aaaattagag	taaggaaata	agaatatgca	ttaaacaggg	tggttaggaa	atgtcctctg
69901	ctaagggtgac	acttaagcag	aatctgacat	ttgagggtgac	atatgacttg	gttctaaaag
69961	cgtgtatttaa	gagactgcca	gaaagacaag	aggggaattt	ccagacagag	aaagtaaaaa
70021	atggaaaaaac	ccagggactc	aaaaaaaaaa	attggggggaa	ataagttgtt	tttgaccccc
70081	taccatctat	tcctccttct	aatgggtggta	ttagatgagt	agacaaaccc	tacttctctc
70141	ctcttagagt	cccagctagc	tctgagaatg	aaattaatat	agcatagatt	aacaggagga
70201	aagcgtactc	tacaagtttt	acatggcatg	agagccctca	tagagaaatg	aagactcgaa
70261	ggagcagttg	gagtcagtta	cttacatact	gaattggaca	aagagcagta	aacttgaaaa
70321	tgtgactaca	ttatatgggg	aggcttaaaa	gataagagtt	attctaataa	aaattgtaca
70381	gaattctttc	agtctcaact	tcttggttctt	gaagataagg	atgtcacctt	tctttctagt
70441	aaagagagtc	tttcatggga	atttcaccct	tttaagaaaa	agcccaaagg	tcaaagtgat
70501	cttgcacttg	ctgtctttca	agtgtcttca	acttaaattg	tcaatatgcy	ccaaaatagc
70561	atatttttagc	cacctcggtg	ccatgaaatt	ccttttagaaa	actgtctcct	tcttctcagt
70621	ccatgtgttt	tagaagagta	aaacacgtac	ctaggcctga	ctaattaaag	catcaaattc
70681	ctgtacaatg	atgagtaact	caacattgtt	caaacatggg	aaatccctgg	gcttgtatga
70741	agggtgtcag	aaatctctac	tgggatcgcc	agtgggtttcc	atgatataag	tctggagctt

70801	ctggaagctg	tcatacctaga	accaggggtat	gaaaataaga	caccacaaca	tagagctaaa
70861	atacaaaaag	aagtaagtct	gatcttcact	tttggttttt	ttttatttat	ttatttctga
70921	gacaggggtct	ccctcctctg	ttgtccaggc	tggagtgcctg	tagtgcattc	tcaactcact
70981	gcaaactcca	cctccccatt	caaataatct	tcctgcctca	gcctctggac	tagctgggac
71041	tacaggcacg	ccactatgtc	cagctaattgt	ttgtattttt	agtagagaca	gggttttacc
71101	atgttgccca	gcctgggtctc	gaactccttg	cttcaagtga	tccagtcagt	caccttggct
71161	tcccaaagtg	ctgggattac	cagcgtgagc	cactgcaccc	ggcctgatct	ttattttcga
71221	aatcctagat	aaaaccaYgt	ttgcaggtaa	acttggccag	tattttttta	atctgtgggc
71281	caRtaaaactc	ctctctttta	cattagactg	gatatacctat	tatttggcaa	tcagagtctt
71341	gatagaatga	atatattgtg	ttggctcttag	tcagtttggg	tttctacaac	aaattattgt
71401	agatgggtggc	gggagggggg	gtgctcaaat	aattaacatt	tattgttttag	tcagatgctt
71461	gggtgagggcc	ctcttcctgg	tcgtgtcttc	aYgtggcctt	tccttggcgc	atgcacagag
71521	agagaacgac	agagagagat	gctgtgtctc	ctcctcccat	tattgcaagg	gcacttgcaa
71581	tatgggagtc	ccttgcataag	gactccttct	tcataactta	attgagtccc	aaaggcccta
71641	tctccaaata	tcatacacatt	ggggattaga	gtttcaacgt	attaatttcg	gggaacacag
71701	gcattctata	gcaacgttca	agaaaagaag	tgtcaaatgt	tatttttagaa	attttgatgg
71761	cacttggttg	agtatccac	aaagacctct	aggaaaactt	tattccttgc	atttaaagaa
71821	agtgaagattg	tagaagcact	gagaaagtgg	gggaggtagt	ttcagaatat	agagtaaaat
71881	gttgtgagga	gtttagaatg	cccacacaca	gaaccttgag	aaatcacctt	ctctggattg
71941	cttactcata	aaaatgtgca	catgtgttaa	gcacagtagg	tactgtggtg	agcagcaatc
72001	tgtgggtgca	aaaatagatt	taacatttat	acattgttaa	agagaaccag	agcctaacag
72061	tagttaaatc	agtaaaaaca	gattagcggg	aaagagatct	cagtatagaa	ctgggctcaa
72121	ttttgaatac	gaaaaggaaa	aatagggtat	tatagccaag	gagcagggtg	gggtatgggt
72181	ggatggaaag	ttactaaaag	gtgacatcac	aggtaaggga	aatctcttgc	aaattgacct
72241	aacaggattc	ttgctaaatg	taggccagga	tgaYtgagata	tcaagggtga	gaaatgagga
72301	atttcatcag	atctgaaagg	tttgggattc	cagctaccac	tgggctatgg	aggcccagca
72361	aggatggagg	cccagcaagg	atggaggcca	aggttgagat	ctagtgaaga	agaggattca
72421	aggggtctga	ctaaagtgtg	ggcaaagaaa	gaatccttgt	cagtgtgacc	acaaatttta
72481	atgtgtttac	aatcacttct	tggtaagcta	gtattgccat	gtttaaataa	catgagagct
72541	taggggacat	tgctcacggg	aaaaatgact	gtgcacttca	gaatccttga	actttgttgt
72601	tttgaactca	actaaaccca	cactttttct	tttccctatg	gatttactat	tatcatcacc
72661	aaataactaac	ctatgtaaaa	ttataaatat	ttataacatt	gcaccatatg	ctttacatct
72721	acaagtctac	ttaaatgggt	ctcaggtatt	gctgtactta	aagtatggtc	aaaaagcacc
72781	tcatacagaat	cacataggag	gcttggttaa	agtcagattt	ctggacctta	taaacaaact
72841	ggatcaaaat	ttctgatagt	ggtgctccag	tataggcacc	actctagaat	attttaataa
72901	aaattcaagt	ctagtcttat	gcacactgaa	gtttgagaac	tattcaacta	tggagcagag
72961	taaatattgg	ttagatttag	acaaaacaat	gagactggta	tttattgata	cccactatgc
73021	tctttacatg	ctttatacac	ctagtctcat	ttaattatca	aaacaggaca	gtgagataat
73081	attttcccta	ttttacagat	gctgagatta	aatgagaaat	ggttacatca	tgcactcaaa
73141	tccacacatc	tgggcactgc	ccaagctgat	agggaattca	ggtctatctg	atgcttatgt
73201	aatagtccaa	tgggttcacc	ttgcccgtg	cctagacaga	gctaatttat	caagtcaagg
73261	gaattgtaat	ggagaaagag	taattcacac	agagcctgct	gcgcaggaga	cagagtttta
73321	ttattactca	aatcagtctc	cataagcatt	cagggatcag	agttttttaa	gataatttgg
73381	caggtagagg	cctgggaagt	gggaagtgtc	gattggtcag	gttggagatg	gaatcatagg
73441	gtgtcaagtg	aggttttctt	gctatcttct	gttcccgggt	gcgatggcag	aactggctga
73501	gccagatacg	ggctctgggtg	gcgtcagctg	attcatccag	tgcagggctc	gcaagctatc
73561	tcaagcactg	atcttaaaat	ttacaatagt	gatgttatcc	ccaggagcaa	ttttgggagg
73621	ttcagactct	tggagccaga	ggctgcatga	cccctaaacc	gtaattttct	atcttgtagc
73681	taattttgtta	gtcttccaaa	ggccaactgg	tccccaggca	agaaacggat	attttcagga
73741	aagggtact	atcagttttg	tWttagagtc	aaaccatgaa	ctgaattcct	tcccaaagct
73801	agtttggcct	acacccagga	atgaaaaagg	acagcttaaa	ggttagaagc	aagatggagt
73861	aggttaggtc	ttatctcttt	cactgtcata	atttcctgag	ttataatttt	tgcaaagggtg
73921	ggccaggcta	ccttctgcct	ctcatttctt	ggataattcca	tgaaaatttt	ccattcacaa
73981	aagcatttgc	taaaatatta	acagtactta	tttgcattgg	aaccaccaca	atgcacacag
74041	ctaggctgat	ccaggaaaat	gttagatgtg	tttcccgcag	tatcattttt	cacaaaagggt
74101	gattgatatt	atacctatct	ctttccctgt	gatttcagga	agtctcaaaa	tctcaaccag
74161	ccaagttagc	tgatcactcc	tacccctgcc	ttataattct	aaaaagggtKg	attaaggtaa
74221	agaatattta	atttccttaa	cattttaattt	tatccacatc	cttttaccac	ttgaggaaag
74281	tatgggtggct	tgactgattt	aatgtgttgc	attaaacaac	tattctaattg	ataataagtc
74341	ttttattatg	aatctaacat	ttctggcaca	gaatcagaca	caaaggactt	ttgaggaacc
74401	ttactattca	aatgggtctga	gagatattaa	aaaaataatt	acagtacaat	ggattgcatg
74461	tgcataatcta	caaagagata	agtaaaaagg	aatggggaat	tggatgcact	aaatgctaca
74521	gaggacagac	atttatgcta	agagatcacc	aagcagagaa	ataatggaag	tcattccaag
74581	aaaaagaata	gcattattca	gagacctcga	gttgtatagc	acttgcccct	aaaatgtatg
74641	tctcagatct	tttccatctt	ctttaccag	ttcatcaggt	accagataa	gtgacttcac
74701	ctgctgtcct	tttcagagac	caaagggcag	gcttgcctact	tacgctcagc	ttatgaaacc
74761	ctggcatgag	ttattcagat	tttaaataag	ctattcctac	aaaaggcagt	aaattcatat
74821	tacttcttcc	attgtcttca	attgcacat	aacattttga	attagaatct	gggaaggatt
74881	tctaattgagg	cactggaaaa	atacttgata	aatattttgag	aatttcttcc	tagtaatatt
74941	ttgagaaaaa	attgtaaaaag	tgttgttgaa	cctaaaaact	agagcgtgaa	agcgtatgat
75001	ctcttgagag	tttattttatg	catacagggg	ttatgagctt	tatgtcaaac	tgcccttgtt


```

75061 aaagaaagca ttaggataag gactcaaaca ttttcagtta ttcttggtca gactttaaca
75121 ttgtgtcagc atgctttgtt tactatgagc atttaccaat tttatatgaa ttaatcacat
75181 ttccatttgc catggatact cctgttcctt taccacaag ttaattact gcttcttttt
75241 taagacaata ttttctgaaa acaataccgg tctcattatt taaWgtggaa acatttctta
75301 gtttttagcac ttctacatgt tgatttgtca ttttcatgac ttataaatgc ttagactatt
75361 actctataac catgggaagc tatttcaagt gaggccagaa aatgggaata catatttctca
75421 aaagaaaata attcaacaag atgttccatt cattcttgct ttggacaaaa cattgttata
75481 ccatatgaca aattaagaaa cactaaatta cagtcttgaa aatacatgtt tatctataaa
75541 atctctgact taagttcaca ttactttttc ccatagcaca gattttaatg tagccttaat
75601 gatatgaagt gaggcagaac ttaggcattt aggtgcttta ttaagaaagc taagattcag
75661 ggaaatatth ttaacaact tggaatctaa tcagtaaaaa tatattaaat tttgaatcaa
75721 aaaatatatt taaaaatata ttgaatgcaa cagtagtggg gcatatttct taattgacat
75781 atatttgttt catctaaatt ttctcctttt gacatcctaa aagatgttgg gcatctatat
75841 aaaaaattca ttcaaagcct tatcctcact gtttttcaac ctggtagtca ctgtgagcta
75901 ccactttact ccatttcatt aattcatttc ttaactcatg tctagaact taccactag
75961 ggctactgct atggtttgaa tatgtcctcc aatgttcatg tgtggaaact taattaccat
76021 tttaatggta ttaagaaatg ggggccttga ataggtgatt aggttatgag ggctcttctc
76081 taagtggatt aatgccatca ttgcaggagt gagttcttca taaaaaggat gattttgggt
76141 ttatttcaact ctgtcttgca tactcacttc tgccttctgc ccttccttca tcttatgac
76201 tttgccaggt gccaatgtca ttcccttgga cttcccagcc ttcagaactg tgaaaaataa
76261 atttcctttt taaataaatt actctacctg tggatttcca ttatagtgca gaaatggac
76321 tgatgggttg tgtaatatat taaataataa caccacagtc tgtcattctc aaaccattag
76381 ttctcatctt tcatctttct aggcccttca tttccacaat tatcctgtag aaatgttacg
76441 tcccttgact ccacatttgt ttccatatca atgagctcct ttctgactct actttcttcc
76501 tgatgcatca tttcaacaac tttctgccaa tactctgaac atgctcatct atttgtcctt
76561 ctgatgcaaa agccctgaaa atcttaagca tttttcaaca tacaaagcct tacttttagat
76621 tgatatttcc agaaaagaat tgggtcataa gttagagatt atctggtttt ggtgctttac
76681 agcttccttt caaataaaac tctgtccttc aggtagtcaa atatatgaat gagttaacat
76741 ttgttagtgg caacaagggg catattcaat atatttaaca acagaccaa tggaataggc
76801 accatattaa aaatgtcacc tgtaaaaagc agccaatatc agcttttatt gaaagcaatg
76861 agaaataact ccagaaagag gtggggagac ggaacaataa aataaaatta agggaggata
76921 cccaggtggc taacagccaa gaaaaatgca ctgaatgaca aagcttttga atgaacaaga
76981 acaaagtcag atctaggaat attagcagca aaagactgtc aggcttcttt ctgggtgctg
77041 ccataaaatg acatagctat aaccactttc tgcctttgta tttttctct caagatcaa
77101 attcttttag tggtagaata tgggtgtccc aggtaggca tgctcctccc acccaaata
77161 catgaaccaa tcaactatggg cagttagatg ggttccttcc actggctcag ccaagttcct
77221 aggccgcccc agccatcaga aaggtgaggg aatttctgga agattgaaaa gggataagtg
77281 gatgaaagca agaggcacta cagcatcttt tgctgtcact gaaaatttct tttcttgatg
77341 gcttttMagg agccctctcc ttagtattat agagagaaat ctttgcttca gttagagttc
77401 aagttaaact acagaccaa aagctccttg aaactctcct tcaattactt tccagattga
77461 ccactttcca ctggctattt atctatctgt ctgtcttctc actcagcttg gcgtgtaa
77521 attggtactt cccagagctt tgacctact ccttttttgt ttcttactca gcaaaccctt
77581 ccctacaaYc tcatccacac ccttggttcc agcttccatg tatatgctga ctctcaaac
77641 tgtagcacag attaatcatt tgcgttttag actcttaaat gcaactgac tattgaacat
77701 ttccccttca gataatgtgg gggaaatttcc cacagaaaat tcaaatttaa tgtttccaaa
77761 taaaattcac catccttctc cccttccatg tcattcctct tctcctctgt gtcacgtag
77821 cctcattcat ggcattacca tctgtgtaa aatccaatct gagagcttgg aatcttcta
77881 gactcaacc ctctctcaaa ctcccttgtg caatccacca gcaaacgat gcagttctac
77941 tcaactgctat tgccccagta aaagcactcg tcatttctcc taacatattc ttctacctcc
78001 tgcgtcaact accatcaata tgttttcaaa atcctgctag aaaaaaacta aaaggcaaat
78061 ttgtctatgt cccttaaaag gctgcctaca aaataRcatc caaactcctt ggtctgggaa
78121 gcaagatcat ctgaagtthg ttatctcccc ctctatctag tcccagctct tgccatccct
78181 ataaaccaca cttagaatgc cagctgcacc aaacagttct gtttgtggaa catggctggg
78241 catgtgcttc ctagacaaa gacaaatcat tctcactgag gcttgtccaa atatctgttc
78301 tgtacaatca aatatatgtt gttttacatt acagtgggta ttagtcagga ttctctagag
78361 aaacagatct ctagagaaaa taagatacat acatacatat gagacaaaga gaaagagaaa
78421 gtgagagaga gagagactta ttgtgaagta agatactggg tcacacaatt atggaatctg
78481 agaaatccca caatctgcca tctgcaagct ggaaactcag gaaaccaggt gagagccaat
78541 ggggtatatt ccagcctggg tctgatggcc tgagaactaa gagtgctgag gtcaggaaaa
78601 gatcaRtaat ccagctaaag cactcaggca gtgagcaaat tcaacattct ccatcttttt
78661 gttctataca catcctcact ggatgatgcc ctctcacaat gagcaaagcc atctgcttta
78721 ctcaagtctg taattcaa atgctagtgt ttcccacaca ccttcataga cacactgaga
78781 aataatgttt aaccagatat ctgagtatcc catggcccag tcaagttgac atacaaaatt
78841 aagcatcaca ctgagtttga gKatatatat tacacaacag tatataactg gagcaggtgt
78901 ttttataatt tacgattttc ccatgggtgaa aatctccagc attacctgga gaatagattt
78961 ttaccttttt acagaatgtt acattttctc ctttctggat tattatgtgg agtggtagaa
79021 aatatatgaa atttgagaac agatctaagt tcaaaaatat tcatttccct tattatcttt
79081 tatgaacttt gataatttcc tcttagtaaa atatggatga tatctacttt gtacRtagct
79141 gtcgcRctta attcagctaa tagggataat gctcctaaca tctcagatgg agtcagaagt
79201 tataaaccag ggactatctt tctccatgat gattagcaat ggaatgtcta aaaagaaata
79261 agagaataaa atatgagaca taaatattha aagagtgtac attgaatagt tggaaacctg

```



```

79321 agagaatcaa gcaaaaatttt attcaaaaaca gtaagaatgt ttaagtggta gctagctaca
79381 aaattaaaaat ataagtcaac aactgtcttg tatttgaaga ataattaatt tgaaaatatt
79441 actaaaaaag acctcYatga gaactaagta taaaatatcc aagaacatgt ttaaaaagaa
79501 atgtgtataa ttattttaaga aaacaatgaa agtctgtcat ataaaaatttt aatatgtggg
79561 gccagcagtg gagtaattgt tttgatgaat atcagttccc ttcctgcaRg ctttaggcat
79621 tacaggggtac actgaaggca acactacagc ccttctgcac agctacctta agtcttttct
79681 cataaagcag atgaggcaga tgtcatcaac tgagagactg gaaaatgcc acaatcttat
79741 ttgtagggaa atgtcaataa ataaaaattt aatgtggaaa ccagttaaaa ggcccatgaa
79801 agtcattttct taccaggcaa gatcaaatcc tgagatcaac tgcctcaaat tgcctagagt
79861 cgggtgattag aagagaaata tataaagctt agctttcaac aaattaactc ttcacatatt
79921 taaagacagt tgaggcttac ttttctgaaa atgtgggggtt taagaaaaaa aacaacccaa
79981 gcaaatagaa aatggtagtt ctttagactt acagaagaaa agcatgcacc tgtttagaaa
80041 gtgttgggtt cttttttaat tttttcaaag gtttaggttt ggtttRatga catgatcttg
80101 atattattat ggtaataaRc tgcatttgct aactatgttg tatgagataa ttattgggtg
80161 ttttgaatct aaagtctttg agaaaaatat ttaatcataa gctaaattca tcataattat
80221 gcacttttta ggaggagttg tcataagata gatttgaatt tacattgagt tttagattgg
80281 aatgataatg ataagcttcc taaagggtggc tggaaatttg tctcttcat agatcaatca
80341 cttttttacac tgcagtgaca atttcatttt tgttcaaagg cttttgtaac agagtctggt
80401 atttctcttg caacgtatgt tatctctttt ttccctaaac cctaattctt agctggcctc
80461 actcccaatg gaaaaaagat gttttccagc aaccgttgaa ttcaatgtgg acatattatt
80521 aagggtcaatc tgatgcccta caaataaatg tcttttgttt aactttctag aagaggggtt
80581 atagcccttt tgcctctctt ttctttcttg ctagctgaaa aaaaattctt tcacacatga
80641 cagagaaata aactgttatt ttattttaagc cattgttatt ttgagttact gtatctcaag
80701 ataacttagt tatctaagtt gtcttagttt actgtcactc aagataacag ttccaattac
80761 aacaaYattt ataaaaataa ttaaaaaaaa caagaaggct accttcacgt taggtaaaaa
80821 aaaaattacc caggagctaa tgatttttta aatcttgctg agtgttttct ggatcctatg
80881 atttctctgt tggtttatta tctaaattgt ttgcatttat cagttactgc tgctatgact
80941 caatcattat aataacatga tcgaaagcct cctatttaat atctactgca atgcacattt
81001 gctgcactga taatattcaa gtctgccaaa caggataaga aaaacaaatg ggatagaaga
81061 aactcataag atatgctaag cacagttaat gaataattta gcagcttgtR aagaaaggaa
81121 aagctcataa agatgtgtta ggtagagggtg gacaaataag ttaattacct aagaaacgtg
81181 tcagccatag atacagtaac taaaatgtgt gtgttaagct tatatagaaa gggctggaag
81241 aaacaggata aaagtaatat tatgatagWt gaagtcctga aagggttgta agcatgttat
81301 tcagccttct agttgctcct catttgctac aactaagact caatagctta gttgaactga
81361 ctttttatgt tactctcttg agagaacaca gtaaaaagct caaacacaga caaaagtagg
81421 catcctggaa tcattctatg cattgccagt tagatgtctg ggatgacctt tgggaattac
81481 tctttttgga gagcctcctt catgtcttcc aatacacacc cctgttcctt ggtgggttat
81541 actttggcta tgcccagtgat tatactggac actgtgtgtc agttccacct acttgcctca
81601 agatcttact tgtgaattct gtcacacaaa cactccaatt ttcaacagct acatctgtgc
81661 tctccctYac catggctccc tactacaaac ttcaaacttc cagaagataa gtgtctgggg
81721 aactgactgg tccttgagct taaggaagca ttgtagaatt aatagcttgc ttataataaa
81781 ggtggctgtc accatcaaaa gaacaatgaa gtattatagc tctggattca ctactgagca
81841 aataacaaaa tggattaact cttcagaaga aaataacagt gacagcctga tatttcatca
81901 tttcatcatg gcatcaattg aaattgataa ggggtctaaaa ccaaatttat caatagctgg
81961 gtagaagaga ttaacatcct agacattaat gaattaaaaa taaaagtcag ctgctttaat
82021 aatccatgga cagaaacaaa aagagatttt taaatgggct caacactcag aagagtgtga
82081 acaatgatta atttttaaaa acatacattt gtgttttttt ttcaactaga agaatctgc
82141 atttgtctag ctctctaatt ttttttaatt attattatta tactttaagt tttagggtac
82201 ttgtgcacaa tgtgcagggtt agttacatat gtatacatgt gccatgctgg ggtgctgcac
82261 ccatcaactc atcattttagc attaggtata tctcctaatt ccacccctcc cccctcccc
82321 caccacacaa cagtcctccag actgtgatgt tctcttctct gtgtccatgt gctctcattg
82381 ttcaattccc acctgtgagt gagaacatgc ggtgcctggc cttttgtccc tgYgatagtt
82441 tactgagaat gatgatttcc aatttcatcc atgtccctac aaaggacatg aactcatcat
82501 tttttatggc tgcatagtat tccatgggtg atgtatgcca catctttgac aaacctgaSa
82561 aaaacaagca atggggaaag gattccctat ttaataaatg gtgctgggaa aactggctag
82621 ccatatgtag aaagctgaaa ctggatccct tccttacacc ttatacaaaa attaatcaaa
82681 gatggattaa agacttaaac gtttagacct aaaccataaa aactctagaa gaaaacctag
82741 gcattaccat tcaggacata ggcatgggca aggacttcat gtctaaaaca ccaaaagcaa
82801 tggcaacaaa agccaaaatt gacaaatggg atctaattaa actaaagagc ttctgcacag
82861 caaaagaaac taccatcaga gtaatttttt taaattcaga aaattctatc gtgtaaagga
82921 aaggggcggc accggcatac ctcagggttt tgtcagaagc tctgatttcc ctgcctcttt
82981 attccctttc tccaaactct tctccacact gattccagat aactctttaa actggcaatc
83041 tgattgtgtc actcctttgc ttaaaattct tcagttagtc tttacaggat aaaatctaaa
83101 gtcctttgcc tgatgaaaat ccctttgcaa tgcacactgt ttaacttcag ggccttctct
83161 tcttctctct tttccctgt tctctgtgtt tccctgtaga gtgcagtggg aagtcagcct
83221 gctgggtctc ccgctgggtga cgactccag cagcaciaat ggcttggat ttcttcacc
83281 cccttccctt tccaggcRtt ttactcagc cctgcccaga gaacagctgc cactctgtcc
83341 aattctgtgg gtctgtcagg cctctgtctc tcccacttct ccttctttct cctggatccc
83401 gatcttttca gcatccctc cagtgtctc tttcacctgc cacaacaaaa ataaaaacaa
83461 aacaagccca catttaaac aaattattag agtcagatat tttctccttt ctttaagacct
83521 agagagcttg tcgattaaac aaataaacaa ataaaatatc acacacagtc cctcaatctc

```

83581	cattcccttg	ctcttggtga	gggtgatgag	caagacaata	tctgccttgt	aaatcagcaa
83641	gacggaaata	tacacatata	tatacatatt	catatattca	tacacatata	cctacatata
83701	tacttgtaca	tatgtatatg	tttctatgta	tatatgtgtg	tttgcatata	gaatatgtgt
83761	atcatgttac	agaggtaaaa	actgttataa	aatgggaagt	tttaccttgg	ctcttaccag
83821	Rgagtgattt	tagggcaaga	tgcaactttc	tctctctctc	tcttcaaact	ctttgtgcct
83881	ctctctctct	ttgtggctct	ctctcagtc	ttaatttatt	tgctaagaat	tgtttttagca
83941	gtaaacaaaa	gacatgcaaa	attcttcctc	tcataaaaatt	tgtgtttaaa	aaggagagga
84001	cagacaatac	acacaaataa	atctagaaag	ccagcagggt	aaagtgatgg	gcagctaggc
84061	agtgaccatg	gggaaggtaa	gggtgggtgat	ggtgtttgag	gtacatttct	caggcagctc
84121	Yccaaattgt	gattgaaagt	ttcctcYgat	ggtgggagaa	gcctaattgca	ttgtttgggt
84181	tcagtatagc	atcttctttt	acataatttat	tcataatgta	acttttttca	acattttgaa
84241	gcagcttacc	acttaagccc	catactgtca	tgtgaaacgt	tgaagcccat	taagatagac
84301	ctcaaacata	agaacaaaat	aagagaccag	acgcggtggc	tcacgcctgt	aatcccagca
84361	ctttgggagg	ccaaggcggg	tggatcatga	ggtcaggagt	tcgagaccag	cctggccaaa
84421	tggtgaaacc	ccgtctctac	taaaaataca	aaaattagcc	aggtgcagtg	gcaggtgcct
84481	gtaatcccag	ctactcagga	ggctgaggca	ggagaatcac	ttgaacccgg	gagggttgca
84541	gtRagccaag	atcRtgccac	tgcaactccag	cctgggcaac	gagcgagact	ccatctcaaa
84601	aaaaaaaaaa	aaaaaagaaa	gaagaagggtg	gggctttgaa	ggaagatgct	gactctgaac
84661	cagcccacct	agactaagag	agtgattgca	Rtgtaacaaa	ggatccctaa	acagtcaagg
84721	caaaggRaca	gatgaaaggg	tttcgaggat	cttcatattg	aaggaacgca	agtctagcca
84781	acttagcatg	gtttttctta	gtaaagcttt	tccataacca	agattttccc	tggttctttc
84841	atcttagaga	aattcataaa	ttggttggtt	tggggggaca	gttaaacaac	agaataaata
84901	atgttcaaaa	atcatctctt	tcataaatct	tctgtaaagg	ctaaaggcat	aatacttaat
84961	tacaactgtg	tagaggcaat	acgatggctt	gctttctgga	attactgttt	ttctcattat
85021	ataaatatgt	attaagaaaa	gatgggtatac	ttttaacttt	ctacttggaa	ataattttga
85081	acatgcagaa	agttataaga	atagttcaaa	gaaaacaagg	atctgtttta	ctcagattca
85141	accattgtta	atattttgtc	catctgcttt	atctttgtta	tttgctatct	atctacattt
85201	ttttctgaac	tactaggaat	aaattacata	caacatgacc	ctttaactat	caatgcttaa
85261	gtgtgtattt	cctaagaatt	agaatattct	cttgcataac	tacattgttt	ttaacattta
85321	agaatctact	aacactattg	tcatttttct	aactgaacaa	agacctgtgt	agcttttgct
85381	ttgttttgtt	ttgttttgtt	tttcagtact	ttcagtatag	gatccactct	aggatcacac
85441	agtacattta	atcttcaggc	ttcttgaaat	tttaactctg	aagagtttct	cagcttttac
85501	tttttataac	atcttttgaa	aacatttcct	tccagttaat	aaaaggatca	tcacttggag
85561	ttttcctaata	gtttcctcag	aactagattc	atgttaacat	tcttagcagg	catattgatt
85621	tgcatactct	tagcaagagt	gctacacaag	tcgttttatg	gtcttcttag	gatatacaYat
85681	gtggagacat	atcatgttca	tctattttcc	gtgttaatat	aaattttgat	cacctgacca
85741	aggtacagtc	cagctactcc	agtgtgtagt	tattatttta	ttctcttgca	atagataagc
85801	aatccatatg	gagatacttc	aagactgtgc	aatatcctgc	tctacataaa	aattttcccc
85861	tgtgatttat	cactcatccg	tgattccttg	atgaactgat	cttcattgtg	atggttgccg
85921	aatgatgact	ttcatactcc	agcatgccct	gcacattcat	cagtcatcac	tcaccttcta
85981	caatgaccaa	gagccctccc	ttctccccag	ttatttactc	acataattat	aatcagcatg
86041	tacttatgga	ttcctatttg	tgcaaagttt	ctgaatttat	tactataatt	acttattttg
86101	attctcaaac	ttaccaatgc	ttggcctgtg	agctcctgcg	tctttgtgac	ttatcccaga
86161	tggtatatac	tccttaaatg	aatgcatggg	aggaccatga	aaaccaatgt	ttctcaacgt
86221	ctgggtctct	tttgtcctgc	atataatcacc	cagggtgctt	aacaaatgca	gataacgtct
86281	tcgtactcaa	acctactgga	ccagactttt	tggggatggg	caaactcaga	tgatttttat
86341	gaacaataaa	aatcaaagtc	gatgacatag	ataaggacag	agaaatctta	taccagatgg
86401	agttaccagg	caaagaacac	ttttccaaga	cgaatgcagt	aggggtcaaa	actattgtta
86461	caaaggatag	agattaaact	cagctctgct	gaaacaaaag	gaggcaggaa	ttttaaatgc
86521	taggggtgagc	ttatggaaaa	gtactgaagg	attttaagaa	ggaagttggg	caaagtgatt
86581	agatgggttt	tattctctaa	ttggcactta	tcctagttag	gttcctatcc	tcccatagag
86641	actcagagat	gggccctatt	tttcttgatt	acgcttaaaa	ggaaggtgcc	cagatcctYR
86701	agaaagacat	tactgggttg	gaaaagattt	atatctcaaa	ggagcaaaaca	aataatttac
86761	aatcagaagt	tttctagtaa	cttctctaaa	aRagggaact	taggggcccc	cagtcaggaa
86821	gaattctgtc	tRaagttag	ccaaactggg	tggaaatggg	aggctctttt	ggccagtctc
86881	cacaaaagca	gagactaaga	ctatcttggt	catctccgga	ttccctgtag	ctagctcagt
86941	ttctaccctg	ttgtaagctc	tcattaaata	catatgaaat	gaatgaatag	attaattggt
87001	catttttatga	tcagagtcac	cagggaat	gtatttttat	tgcaRaaatt	tacttaaaact
87061	ctgtaggtgt	ccctctgttt	cttttaggcaa	tattttctcaa	cctgttcaaa	ctctaaaaat
87121	ctcctggagg	gcttcataaR	aatcaggttc	cagagctgta	cctaagattt	cactaaatta
87181	aaatgtcagg	aagtagagag	gtaagtatct	gtattttta	gcaatttaaa	aatgctacca
87241	ggggagatga	tttaagcatc	tatttcctta	acatctcagc	accataggat	catattttta
87301	aagcctcaac	ctgtatttat	ttcaataaga	tgtcagggtga	ctctattcag	ctcaaattta
87361	aagaMaggat	tcagttgcca	tttccaagtc	tgagggtgcc	tgtgggtgta	ttgagcactg
87421	gtcttaataca	taccctcttc	tgctgtagcc	tccgggtttta	tgggaagcat	aagatcaagt
87481	cctgctgaga	ttttaaatgc	agcctccgct	actgctgtgt	tctgaaacct	agaggcgttg
87541	agctagtagc	atttgtatca	attactatta	aagtaaaagt	ttggcacaac	cacatctctt
87601	gagtaagcgt	gtaatgaaaa	aaaaaatcac	aaaatgcttt	tctctgaaca	cattctagat
87661	tctatcccca	ggatgggtggg	caaaatttca	tcctcgagag	gctatggcac	atgtcccttg
87721	tttgtacccc	ttgaaaacta	gttggagaaa	ttgcctatat	aattatttca	actgggatta
87781	aaaagaaaaa	atacccgcta	atcagtatca	ataatataac	tcttacagaa	ttggtaagaa


```

87841 aacctctaaa tcttgcattha ctgtgaaaat taaagtttta ttcaaaagct gtagggatta
87901 taataagaat aatttccact gctgggttaag agcttactaa tttccaagca tgcctctaag
87961 tagtccttat gcatcatctt atttaataat cataatggcc acataaggta gataattatt
88021 atgctcgttt tacagataaa gacactgagt ctcaaagagc ttaattagct agctcaaggc
88081 catattgcta gtattacatt agtgcaaaaag taactgtggt atttgccatt taaaaaaaaa
88141 gtaatggcaa aaaccacaat tacttttgca ccaatgtaat acatgcggaa gcagagcttc
88201 aaatgctagg agctgtcttc agagtttagca ccaacgtaat atttttaact ggtgggtctc
88261 aatcagagac aattttgtcc cagaagacat tagcaaagtc tgcaagcttt ttgtttgtca
88321 aagggagagt tagaggggtg gYgtgctatt ggcattgtgt gggtagaggc catggatgct
88381 gctaaacacg ctgtagtaca cagaacagcc tccacaacaa gtaattatcc agcccaacat
88441 atcaatagta ccaacactta aaaaacctgg cacattggaa aataaagcct tttgaggNta
88501 ttttatgaag tatacattat atatacatat atgtatatat tatatagagt ttcctgagaa
88561 ttgttcatgc cgtaaagag gaaaagctRt actgtcgatt tcaagctcta cgtagtaata
88621 gaaacctgga gagaacactg aaaaactaaa ttcctgtgga acattaaaaa tctttaattt
88681 agttaagtat ttcatcaaac agctttccag aaccgttgat tagaaagggt tctgtttcca
88741 cagagaatct ctgagtcaac tctaccagat gttttatttc atgttttccc caaagatatt
88801 tttatttcag agcaagactc attgaaatgt taatttcggt aaaattgagc taacttaggt
88861 aacatatctt cagtgttata ttcctttaga gctaagattc tatataattt caattaagat
88921 gactcccctg atttagaatt aaataggtaa aagtaagcaa ttcgaatagg gcaaaatctt
88981 aagatgttat taaaatcaac ataattttat atttccttgc ttgatttttt tttgaagtca
89041 tgaattgaaa tatattctaa ttggaaaagc aataagagtg aatgaggctc tgcggaaat
89101 taaatttaat ctttcttttt aatgatgcag ccaacaaact ttgggaaaat gtcaaagaaa
89161 tattttatgc ttacttaaact caatggacta aatgaatact tctttcttca gttgtatctt
89221 aaagtcaata tacctaagcc acaagcattt aatataatatt ataaaagagt gattcctttc
89281 taaaccatca tcgttagagt ctttggaata aatgacgata aaataaaatt cttctgatag
89341 ctaaatcttt ttgtgtggaa cccaaatatt ttaaaatata ccatcgcagt tatcagttgc
89401 taacaatat cctgtcaaact gtaaaatgct gcatgtaaaa tatttttcaa attttaagtg
89461 gttatgcatg agcaatcaat gtgcactttc atttgtcaag agtaagaagt tattaccaag
89521 caaagcaatt ttagagcaag aagagcttta aaagtgtgcc cagtacatct tgttcccttt
89581 agagctgaga aactgatgt cagagaggat gacttttcca aagtagtaga gtatatggct
89641 aggactggct gttaagccac tgattccatg cagcctcttc tactacattg tgccattatt
89701 cccaagaagt aaaaattagt tttttccctt ttcaataactt agaatgcaa gtatagtgt
89761 acgtaccaa ctagctgtta tggtcagcag atgccaaaga gcttaaaatc ttttgggaaa
89821 ggaataaatg aaaaagataa gaaatggtta tacaaggcac aaactctggt agagaagaga
89881 catttccagt tgggatgaaa acaatcatct ttaaggggaa tggtttatct gagtcagctc
89941 ttcaagtaga aatgggattt caagagaaag agtaaaagga caggagcttt ctgagtgggg
90001 agatctatgt gaacaaatat gcagacgtag gaaattatag gcatagctgg gaaaaaacga
90061 aaagacttgt tgttctgggg tatgtgattt gcataaagaa tgtgataata aatttaggaa
90121 agataagttg gaacctggtg actctggtgc cttgcaatct cctggtgatt gtagagagtc
90181 ctaattgcag gccgggtgca gtggctcaca tctgtaatcc tagcactttg ggaggccaag
90241 gcgggtggat cactgaggt caggagttcg agatcagctt ggccaacatg ctgaaacccc
90301 gtctctacta aaaatacaaa aatcagtcgg gtgtggtggc acactgctta atcccagcta
90361 ctcaggaggc tgaggcaggg gtatcgcttg gacccggagg gtggaggttg cagtgagctg
90421 agattacacc actgcactcc agcctgggca acagagcgag cctccgctc aaaaaaaaaa
90481 aaaaagaaag agtcctcatt gcagctagaa gtgaatgatg agcagaattc acaagaatgg
90541 ctgcttgaat gtgacctgt caaaggctat tttgtcacta gagcctaagt gaataatata
90601 taatatgaag gaaatttttg tttgtgtttc taggatttat tttatttttg tggtcagcaa
90661 ttatgcaaac caggtaacat gatgaaactt tgggaagcta ctaaaactgc tgtacatgaa
90721 tgttgcaact gaagttttta aagtttctga tgattcgtga taccaaattc attgtatttc
90781 tgacatttgt aggtcagatt ggaaactaca aaagtaatga attatggatg tagttctgct
90841 taaagtgtt taaaacatttg gagtttacca gtcaagtttt ttgtgataga gaaaaaatga
90901 caattaaatg gtctagaaca taaataatta attaaaaaaa gaattttaaa taaaaatctg
90961 aaagaatcta tttgccattg tttgactttt tattcatgtt tttatgagaa tocagggata
91021 ctattactgt gaagtttagg tgcttcctgg gaaagatttt aagatttctt cttcttacta
91081 gaaattatc ttttaaagag atgctggcaa ggagaatcat gtgggtcagt acacttttaa
91141 gccgattcta ggatgcttga ggcaagagta caaacatgaa aataaaatga agatttttca
91201 agtttgagg aaatatattca attggaaacc gtggtttctt atgacaaaat aaaacatgga
91261 gttccaaaat taatgatagc taatgtttat ttagcactgg gaattaaatg ttattctaag
91321 aggcttatat gtactaagac aaatacccaa tcaggtattt tatagagagg gaaacggaag
91381 cacagcgaga ttgagtagcc tgccaatggg gaagctcgaa aataaatgta ggcagtctga
91441 ctccagaaaa cattctctta actattgtgc catgtgtttt cttaggacat ggggagatat
91501 ccagctccag gaaaaagtgg aaagagcgtg gaaaggacta ttagattaat taatcctcct
91561 atcaaagtaa ggtcaaaaga accctatctt tagtaaagat agaagtagat taaaattcat
91621 aacattagaa tattttttta taattccttc tgagaagaac cagaactcag taagagtagc
91681 tgactctact tgaggcagaa aatatcgagg tcagcctgta cattttgtta ctgcaagaaa
91741 acatggatac ttttaaaggt gtctgtggct gaactaaaca atttagacc aatgggcttt
91801 cgttgtctgt actgtcacia ctagagcccc gggttatgtt gtgagagaat ctaacaatga
91861 ctttaattat tagaaccagt tgacagccag gcacggtggc tcatgcttgt aatcccagca
91921 ctttgggagg ccgagggtggg tggatcacia agtcaggagt tcgagaccag cctggccaac
91981 atagtgaac cccatctgta ctaaaagtac aaaaattagc cagggtgtgat ggcacgtgcc
92041 tgtagtccca gctactcagg aggctgaggt gggagaatca cttgaacctg tgaagcagag

```


92101	gttgacagaga	gcccaggcca	tgccattgca	ctccagcctg	gtgacagagt	gagactccat
92161	ctgaaaaaac	aaacaaacaa	acaaaaaaac	tgacatggag	aaaacctatt	aattgatgat
92221	gatgctcaat	atgagcaaac	aatatatagc	atgtctcatg	gactgcatgt	gtctccctaa
92281	agttcatatg	ttgaaacctg	aactttcaaa	gtaggtggca	acagggcctt	tggaagataa
92341	ttagagtcac	gagagtagag	ccctaattat	acatgggatt	agcgtcctta	taagaagagg
92401	catgagactg	atgggtgtctt	tctccaccat	gtgaggataa	agcaagaata	tgtcaatctg
92461	caacccagga	agaggacctt	caccaaattgt	cgaattagcg	ggcactttat	cttggactta
92521	ccagcctcca	gatctgttag	aaataaattt	ctgttgctta	agtcacatg	tccatgatgt
92581	ttttgttcta	gcagcttgaa	ctaagacagt	atcctagata	aaaatcatat	gtgagttatt
92641	ttatgggtac	aaaattgtca	acaacacaaa	tatatgacca	atgggtgctac	agaaatgacc
92701	acacagcctc	cccatcaaga	ttcaggtgtg	aactacagtg	aaattactgt	gtgaacatgg
92761	tccccgtatt	cagtatcaga	aacatcccta	ataagagaat	taaatcaaag	caggagactg
92821	gctgcaggca	aatagatttt	ctatgaggat	atgaccttgt	tgcttcatgt	agaaagcaac
92881	atccttgata	tgtgtaaata	tacttgatta	aaagtgtagc	ttgtttgctt	ttttcctaag
92941	ttctctctga	ctactgatat	ataccctgat	gacaaaaggc	ctgggcatgg	caaaaatgga
93001	tttctcatat	ccaaaagacc	ccttccctgc	tcaaacagca	tcacaagcac	tatccgcacc
93061	tattagatat	tgtgcaggcc	aagaaggcgg	tgctgtgata	catgcatctg	cttcttctcc
93121	aaggggtcaa	cccataccca	atactttttt	tgcatctctg	tttaattaaa	ttggaaatgt
93181	aatcaaatat	gtcaatgagt	atatttttcag	tatatctctt	cccatttgta	ggattatctg
93241	aaataatata	acctttaata	taagttttcg	aagttctgtt	agacttatat	atcggtcata
93301	ttactcaacc	ttttgtacca	tttatttgat	tgatgggtaa	ttgtattctg	attatatgtt
93361	tacaataata	ccaaatttat	aggattgttg	gagatgatgc	ctagcacatc	tgaagggtccc
93421	caaaaaatgt	agtcttttat	tactactact	tcaaagttga	caaagagagt	caactttata
93481	ctcctagagc	cccttaagaa	tatagcataa	tggtcgccaa	catgaacatt	gtgggcagca
93541	cagtgtaccc	ctgctcacag	tcctaggaaa	tccttgctact	ccagtgtgct	agagtttctc
93601	cgacactgga	aaactgttgc	ctttattcaa	tttgtctcag	tagctctcaa	cctcatgaag
93661	aaaaagtcag	tgtagaggaga	gaagaaagag	atcaaagaga	agcatttggg	gcagagatta
93721	cgggaacgat	gtaactactg	caagatggtc	agagaagggt	ttatatattg	aaataatgtt
93781	caaatattga	tcacgaccca	gaacttttcc	ttttgttctg	ggatacagtg	agatgaagga
93841	gagtacattt	tgcatctctc	tttgcccttc	ctttgtatat	tcttttgtaa	cacctatcat
93901	taaatagaac	ttccaccggg	actcaagcca	ccccaatgtg	gtatcagtc	tttaatttat
93961	aatacacatg	tgctaaaagt	tctgagcttt	tccgaaacct	aaaatctctc	tcagtccatg
94021	ttctgaaagg	acagtaagaa	aaggcacttt	acaactatta	ctgaacatct	aggtgggttag
94081	agagaccaga	caaatacacag	aagcactgtg	cacaccata	gtaaagggaa	ttaggaagaa
94141	caggtgactg	cagcttttca	tatttaaagg	ttgtctggaa	atcagaaaca	gcataattga
94201	ctactctagt	aaactccaaa	gtatatagtg	actcagacag	ggtaagttta	ttctcatata
94261	tttaaagtgc	aaatagatag	ttttattctg	ccagtagctc	ttctccaata	agtgattcag
94321	ggacttgggc	ccgttgattc	atgtgtctct	gtgatcttca	agtccttatt	tcccagggtta
94381	ccaagtttgt	ctgtctcaat	cctgaagaag	aaagagcatg	gtgggtctag	cacccatggg
94441	caatatgtta	cattcaagcc	tgagaatagc	acatctcact	ttcactcaca	gcccattggc
94501	aaatattcag	taactgcaaa	ggatactggc	aaatgcagtc	tagctgtgtg	cccagaaaga
94561	agagtaagta	gatttagtta	actgttagcc	acacacctgt	gggaaaaatg	ctaataaaaa
94621	atcatacttt	aaaattttta	ctgagaataa	cacacctcac	tttctctcac	agtcatttgg
94681	caagtattca	gtaactgcaa	aggatactgg	gaaatgtagt	ctggctgtgt	gcccagaacg
94741	aagagtaagt	agatttagtc	aactgttagc	cacacacctg	ctggaaaaat	gctaataaaa
94801	aatcatactt	taaaatttta	actgagaata	gcacacctca	ctttcactca	cagtccattg
94861	gtaagtattc	agtaactgag	aaggatactg	ggaaatgtag	tctggctgtg	tgcccagaat
94921	gaagagtaag	tagatttagt	caactgttag	ccacacatct	gttggaaaaa	cgctaataaa
94981	aaaatcatat	tttaaaattt	taactgtctc	tttgagaagc	attttgcctt	ttaaaattat
95041	ataaaaatata	actgtattca	tattttatat	acaggtatat	atttataatt	ctcaciaaaca
95101	gttcatattg	aaagagtcaa	tctaagaatt	catcactgac	cccacctggg	cttgaaataa
95161	aattcattac	tagctggaca	atcctatcag	atatcattta	tttggacagg	ctctgtacag
95221	taattctcta	gtattccagt	gtactgtttg	gtataactta	tagtataagc	agagtggctc
95281	ttaacttgta	tcactctgtt	catttcatta	gaacttaact	aatagatgga	ttgtgtctgt
95341	aatcccagca	ctctgggggg	ctgaggtggg	aggattactt	gagaccagga	gtttgagacc
95401	atcctgggca	acatagggag	accctgtctc	taaaaataa	aaataaatta	gccaggcatg
95461	gtgtcgcaca	cctgtagtcc	cagctactct	gtaaagctga	aRcaggaggg	tcacttgagc
95521	ctaggatgtc	gaggctgcag	tgaggtatga	tcataccatt	gcactccagc	ctgagcaaga
95581	gagcaagaac	cccatctctg	aaaaataaaa	aaaaaagaac	ttaactaata	gacattagca
95641	aggcccccac	tacagactgt	tcacacctat	gtttataact	gacactaaag	ctgcaacaag
95701	ggctgcatgg	acagaattcc	aggtgttttag	aattgcaaag	tgaattgctg	ttttaattaa
95761	tgcttgaaag	taaattgcag	ttttcatgca	tataatacat	tattattaac	tatagtcacc
95821	atgctgtcct	ttaggtctcc	aaaacttatt	tatcttataa	tcaaataattt	gtaccttttg
95881	actaatatct	ctccatttct	tccaccctga	ccctgggttaa	ccacaattct	actttatttc
95941	tgtgactttt	tttttagattc	cacatataag	tgagataagg	aggtatttgt	ctttccgtgt
96001	ctggcttatt	tcacttgaaa	tttggttaaga	gagaagattt	taagtattat	aagcacacag
96061	taaaaggggg	gtaattttct	gaagtgatgc	ctatgttgat	agtcatttca	taatgtatac
96121	atataatcaa	acatcatggt	gtacaccttg	aatataatca	atttttgttt	gtcaattata
96181	cctcaataaaa	gttgataaaa	gatcaattgt	attaacagaa	catacatata	aaagacaaaa
96241	tcacccatca	caataatgtt	ttccatattt	tcatagtatg	cacagtctaa	acaaggacct
96301	tcaacagatt	ttaattttgt	atttgttggt	accattcaaa	cagttttcat	ctgggtatta

```

96361 taataccaag tatgcatgta gtgctcactg gaaaaaaaaa tgaatgattt ttgatccact
96421 gtcattacaa cttttttcat gaagtaactg gaaaattgca tatattatcc tgtcaccccc
96481 aattttatag tcctgatgcc ttttataaat ctatggctaa gggagacctg cagaatcaga
96541 aaattccctc ggagtgggtc tgggcttggg aacaatctaa gtagcctagg gaagctatta
96601 ctgaaagtgg tttctcccca gctgagaaat gtttcaaatt taaagattta aagtctccca
96661 accaattcac atgacatgtc agatgagtggt gttaaagagc tcaaaacaat ttctttaaaa
96721 ttctaacttc atctctatag ggaaagaaat aagttgggat gttgtttctt aattggcaca
96781 ctcatatgag gtctctccat gaagggcaat cagttagttt ctatgaagca aagaccagta
96841 agctctggcc tctgcattaa caagtgatca tttagtaaga gtcacaggaa agcagaatta
96901 aggataagga caaaatctca ggtggaaatg tgggggaaag gtgtgctgag taatttcttt
96961 ctcatgtYat agagaaagat gagcaagaat atagacaaag atcgaatagg aatgtgtctg
97021 cctagactgt gttagactat aaaaattagc ttcattgata cgtgcttaaa agcaggagta
97081 ggattcaaaa tattttacca ctggtatggt ttgggcacca acccttcagt acagctcctg
97141 agtctaagca accgatcggg caatgagtac cagcagtggg cgccctactg aagaggccaa
97201 ttgagcactc agtgtggcaa gagaaagttg gaggaacaca ggggctactg catggacaga
97261 ctatttgatg agaaaacaac actcaaagat gatttctgtc tttgctgtgc atggccaacc
97321 ctgatgtctc atcaggagat gcaggccagg tgaaataaag ccactcaggg ctattgagat
97381 cctgtgatgc tgtgatttat cagagtcagc cagaggactc atgtcatctc ttggtgtata
97441 tccaaaaYgc tggcgtttgc tggactacta gactgctaga atgctgacga aatgattgta
97501 atggccttcc ccctaacttc tctccaatct ctaattgtct gtattttttc cataatgaat
97561 atcatcaYct gaacttgcac tatttgttca cttttctccc tcaactaaaa tataagcttc
97621 atgagagcag agctttgttt tattattggt gttgttcact gctgtatccc tagtgccata
97681 gaccatgtct ggtacatagt agactctcaa taaatactgg tgtatttatg aataagtaat
97741 aacagtaact gtcacctagt aagggtctaa tctatttcag aagtaggctc tttaattgca
97801 ttacctgatc ctttgtagcc ttaatgtcct tataagtttt tgcacagtaa tggagtgaac
97861 ttaacaatag aaatctaaat atccctgccc tccactcttg gatttccata ggggtgcctc
97921 catctcagca caaactgacc gcaagctcaa atcacccctga ggcaactttt tctaataatt
97981 ttgttcctta tgtctctttt tcatatgggc agccccggtt gccctgtaag ccataggaat
98041 gtgcctccca ctgccacagt ggaaagtgtt atcaaaacaa aaattggcac aggacaaagt
98101 tcaacaaaga aatttttatt caaagctatt gcactaaggg agagaggcca gaattaagtc
98161 tgaacttaac tgaactgagc tgaaagggaa aactcaagct atctatgttt gctaattggc
98221 aatattcaaa gagggaaaac tcaaggtgtc cgtgtttgtt aattggcttt acccaaagga
98281 aaagtaaagt tgcacttatc ttcattgtcaa tagacagtbt tacaatgtgg agcaagatac
98341 ccacaaaagc taggcatctg tctcaccaca gagactgagc gagagggatt ctatcttctc
98401 tgatgatagg atagccatca aagggatggc tcccaggtcc ttaagaaaga tactcgtagg
98461 ttataaacgc tggccagaag cctttaaaat gatataatc tcaaaggagc agagaaggaa
98521 tttgaaatta caggctttct aaagtaaatg ttctaagaaa agcgaggtca gggccctgga
98581 gtgtctaaag tttcatcatg ctgaaggctg cttctgtcag tgttcacccat ggggaacacc
98641 agtgcagggc tgtctcttgc tactctcaga gccaaggggtc attaagatgc cacagcagca
98701 ctgtgggtcca tgaaaaagga gaaYgccctt ctctcccaaa gggtaacctg cggtaacttg
98761 aacctttaag tagcactttc tgtgtaattc tagttcccat ctctctgtcc actggatcca
98821 atatcaaact aaaggactag aacatggcac agagtatggc atcctctccc tctccctcat
98881 ccaacttacc tttccctcta actgcttaat tgtcaatcct gaaaactagt tttctctact
98941 tttagcaaaa

```

Chrom 6 genomic sequence (SEQ ID NO: 3)

>6:170689051-170779900

```

1 tggcctagcc caggccatct gccacacttg catagaatgt ttttcctatg gaagcttatt
61 ttggaatata atcacagagg aaattgagat aaacaggctt ttccttttct ggacaattct
121 tagagataaa atctactgca gaaggcaaga cacttaactt ctgcccagaa actgatgtca
181 cgtgggttaac gtgtgggtggc cacatcaact gaagccgaca gtgacaccRa gtcagcatcc
241 tgggtgcagc tgccaccctg tcaactctcat cacattccac cattcccagg ccacagaggc
301 aagaggatac tctcaaaact tagagatagc tttagtttta ggaaaatagg acggaaaaat
361 atcttatgcc tcagaataat aggtggaatt caattgctct tcaaggcagc acaagcataa
421 tgtccaaata ggcttacaaa ggctttccct agattgtggg tgattgatct gtggcaggct
481 attaaaggga gttcaggatg gccaggctat tttgaggctg atatcttgga gaaccctctc
541 tctctcctgc aaaccactcc cttggcatca ctctcagaga caagctgctg gcctgtgcag
601 cccacaccct gactcagggt ggcatttttc tcaagccctc tctttttaag gccatcaggg
661 atctgagccc ccatgggtag ggaacaggcc aggcagctgg agcgtacaag agtcaccact
721 acgaatagct tgactctgaa gtttctaaaa gggaaacctg accacctgag cctccccaga
781 agacgcctca gtcacattta ccctgctgct gccattagta tcaggcagag ccatctgtac
841 acgcgggaac atgaagggca ctttgcaaga cttcagctgg tgggttaaat gtggctcaca
901 gctgtcgctg aggcacactc cccaaaatag tctcaacaca gcagtaggaa agatgacaca
961 gaggtgactg agactaatag caatacagta ttactattat cccttgaata aagtatgtaa
1021 atcaaggtgt taaccatcag gagcagagaa aagagagtgt taagtatagg ggcttagctg
1081 taaaaagaat cagaagaaaa agaaaaaaa accctcagtt aaagggctag atagtctaga
1141 aaatttggtt ggtatttata ttattaacac agagcagggg aacacgatag aatagaaacc
1201 tgttacaaac aggaacaac aacaacaaaa tagacaacaa ccctagaaga aaaatgcctt

```



```

9781   ccccttgccag gcagtaatga agagaaagtc tctacatcag cagcttctca ctggaatctt
9841   caagcctaac tcttaagaat gaatcatact tctaattgtt atcaaagggt ttcttttcac
9901   acaaggaatg tgccctgaatg atctataaaa ctacccaaat aactagtagc caggtagct
9961   ctaggagcca tatgccaaac acattctgga ctaagtctg ttcactccaa aactaagacc
10021  atgttcaaag tctacagcaa tactggatta aaacaatgtt agctgaagggt tgtaaaaaaa
10081  catcatggaa cactaattat gtgccatcaa tcattactca atttgtagaa ctccctata
10141  caccttggga ggtgagaacc ttatagaaaa tcctagatac acaactttat ataaacagaa
10201  aattccaaaa tgggaaatcc tttagaataa gaatatacct agtgtatata aagaagaaaa
10261  aatgtagatt tgaaattggg atactctaca gtttttagtt gggacattgg gatagttaat
10321  tttaggtgtc aacttgactg gattaaagga tatcaagaca gcaggtaaag cactacttct
10381  ggggttgtct gtgaggatgt ttccggagac tggcctagga gtttgtggac tgagtgcaga
10441  tcagcctgtg tgagcaggca ccattccaact gaatggagcc cagatagaac caaaaggcaa
10501  aggcaaataa ttactgtctt ttctcctcga gccagggact tgattagcaa cccctcacac
10561  ccaactcctt attttcagga cttcaagggt tataccatca gcttccctgg ttgtgaggcc
10621  ttcagacttg gactgagcca tgctgccagt ttctctgggt cccagcttg cagacagcca
10681  ggcattggga ttctcagtct caataactga gtgagccaat ttctttaata aaccctttct
10741  catctctctc tatatacaaa catatcctat tgggtctgag tctttggaga atcctcatac
10801  agacactgtt aagagatgaa ccagggtgta ccactgtgtc cccaatgcct gggatagtga
10861  gtgacagtat tgatgtttgt gcaataaatg tttacaatgt gtatctacta gcagctttcg
10921  ataatttgaa ttatttataa aaggcaaaat aaacaaaagt ggtatctaag attaaccact
10981  aacttagtaa aattccattt ataccacagg ttgttctggg acaaagcata caataactcc
11041  catgttacat ataatttgac ttgttcaata acaagaaaat tactcaaata ttataatgga
11101  gttaaaatgt atttaataga tctaaaaaat tttggctcta tcaaaactta ggtctcaatt
11161  ataacattac taaagtgtt gtaaaaatta tcccagattt ctggctacag cttgtataaa
11221  ggcctatttt ttttttttta cagttttatt ttggttgaag atttttctcc aaaatagcta
11281  ttccagatgg cttaacagtc ccagaagtga aaaatcttaa gatatttcat ttataaccat
11341  tagagtctta ataaaaccct agtaaatact ctcccttctg gatggtttta aggtcccttc
11401  aggcaagctg gctgcgtaaa caccagagcc ctcttcataa gataagtttg ctcaaaagggt
11461  caacttttac agagaaattc ctacctatt agtgtaaggg aaaatataca tgacctgttt
11521  tcattactta aaatgcaaaa aaaaaaaaaa aaaaaaaaaa aaaatctcag aaaaatagaa
11581  aagggtggga aaaatgaaga aaattaaaag aaattctact tcctatatct gtccctgctta
11641  gagaagacaa gttatagcaa aatgagtagt tcagggtttt cttttaataa acaaaaccat
11701  ccaagggtaca gttccaaagt acaaaatcaa ccagggtctga actgattgggt gataagagca
11761  cacagatcag tccttcctta aggaacaggt ttccctccctg atgcctctt ttgtcactat
11821  gcagatccgg agtgcgctccM cagtgtacac atctctctca gccgcagaaW tgaagacatc
11881  tttcaccagc cgcattggctc tgtccaagga cagcggaaaca tgctccacat tctgcatgtt
11941  cttaaaacca acctgggtggg acatgaaact tgggtgagat gtcattgtgac agtgagcaca
12001  aaggaaagggt tcaagtttct tccaataccc tcattgtgtac gaggattttgt gatgaaaata
12061  ctaYacaaaa ttaaaatgtc cttcagactg aataaagacc cttccagacc ttgatgaatt
12121  acacacatca gaaatctgac aacgattccc tggcaaagct cccactcttg agaagcacat
12181  gaccgggaga ggtggacgta tgcaagcaaa gtgatcagag aattgctata actaagaaga
12241  aaataagagc caggagagcc ccaacagatg tccactaagt ctctagaag aagacaggct
12301  tcagcagaaa ggacttttaa gtaggtgagc gctgaaggct aactgaaga gcacagaaca
12361  ttccagactg aagatgtggg acggaggttag gaaaagcaca tcttttctga gaaaagcaga
12421  gttaggggtc ggggtgtagt ggggtgacagg agatgagggtc aataagcaat aagcagagga
12481  gtagctatat atgacatcct tcagaaaact gagcaggagg aattagggaa gtaaacttgt
12541  aggcagaaag gatgttagga aataaatcca ataactaat aatgtagggtc tgaatttagc
12601  cagcagtaat cacaaagagg gacgaattag aaatacaggc ggcctttgaa taacaccgtt
12661  ttcaaccact caggccact gacacataaa ttttcagtaa acacactgag aagtttttgg
12721  agactcgcaa cactttgaaa aactcagatg agccaagtag cctaaaaata ccttaaaaat
12781  taagagaaag gtatgccaca aatgtataaa ctatatgtag atactagcta ttttatcatt
12841  tactaccata aaatacacat aaactgatta taaaaagtta aagtgatctc tcaatgttct
12901  cttttgtttt tcattgtgtt tagtgcgatt attataaacc ttaaataaca agtggcccaa
12961  acaaagcact attagtgtg ctggaactgc tcccgaagaa gcagggaag ttatgacatc
13021  acaagaaaaa gctgaattgc ttgatattga ctgtagattg aggtctgcag ctgtggttgt
13081  ccaccactcc agacagatga ttctccttgt aaacagatga tgtaaactta cagtatcaac
13141  aaatacagta ttgtaaatgt attttctctt cctataattt tcttaataac attctcttct
13201  ctgtagttta ttatcataa gaatacagca cataatacat atgtaaaata cgtgataatc
13261  cacagtttac attattggca aggccttcag tcaacagtag gcttatttgt aagttttctt
13321  ggagtcgaaa gttatatgtg gattttccag tgctcgggga actggcgccc caatccccgt
13381  gttgttcaag gStcaactgt atgcttggga gttcaagtac agtattgggt aacacagaaa
13441  gggggggtaa gagggaaaaa ggcattttta tgatcttcag gtaaagacag caagagaatt
13501  agccactaca gacataaaag agttggaagc catgagaata caggaaaaca atcaaaacca
13561  tgggagtagg taaggaccca caagagagta ggcagaacac agagagagac catgaggttt
13621  ctgtaggaca cgtctgccaa actcaaacag taatttataa gaaagtcttt atatcttggc
13681  tctcctaagc taatgaagag gagaacttgg aggaaggcac ttcaactgaa caccatgaca
13741  agttggacat agtatcatta cctggacaca gtatcattac ctggttgtca agcaggggtc
13801  gtagcatggc acttgctgag cctccagcct tgaaggagtc tctctggtaa gaccctactg
13861  gatcaaagct gtatacagcc ccctttcctt aaagaagaaa acagtattca taaggatgggt
13921  atccaatcac aatcccaaat catcgcaaaa ataaatcagg tcaaaacgtg acacaaaacg
13981  gactatcacc ttggctaaaa cttcagggaa cagttggaac acagccactg ttgcactgggt

```



```

14041 gacagctgca gcacacacac tgttgccacat gtgacagcca gaacccagtc accattgcac
14101 aggtgccacc cagcagacag ccccaatccc cgtgttggtg tgttgttcaa gggtaaactg
14161 taggcttggg agttaaaata caatattgag taacacagaa aggggtgggt agagggagaa
14221 aggcattttt atgatcttca ggtaaagatg acaagagaat taaccactgc agatgtaaaa
14281 cagttggaag ccatgagaat acacaaaaat aatccaagcc atggtagtag gtaaggaccc
14341 gtaagagagt agggagaaca cagagagaga tggtagaggt tctgtaggac acatcagcca
14401 aactcaaaac gtcattttgt agaaagtctt tatttcttgg ctctcctaag ctaacgaaga
14461 ggagaacttg aaggaaagca cgacttatgt atatagacag gtccaaggga cacatccgca
14521 agacacagta aaacgaagag aattctgtta cctgtaaaat acgatactgc ttttgtttaa
14581 aagaataaga aaactatttg tacaagcaca aaaaagtctg gaaagataag taactgtggc
14641 tggatcatct tgagctctga attagaggca agaaaagaag ggaattaatt catgtgcttc
14701 tatcttattt gagtttgtta caaagaacac aggtgattct acaatcgtta aaaaggcctg
14761 ttaaaaaaca ccgtgttctg ggtatgagaa atcacgagtc atttacaagg tatgattttt
14821 taaaaacata actgatttag aaaacacatt atataccaga actcagtacc ctgggagatg
14881 tgatataggg acaatctcct tactaaccat gtacaactgc cactgttagc tttgtatgtt
14941 ttctactata gaactgcgta aacttggcca ggcgcgggtg ctacgcctg taatcccagc
15001 actctgggag gctgaggtgg gccgatcacg aggtcaggag ttcgagatca gcctggccaa
15061 cacagtgaac ccccatctct actaaaaata caaaaattag ctgagcatgg tggcacgtgc
15121 ctctattccc aactacttgg gaggtgagg caggagaatc gcttgaaccc aggaggcgga
15181 ggttgtgggt agccgagatc atgccactgc actccagcct gggcaacaga gcgagacttg
15241 gtctcaaaaa aagaaaaagg attgtgtaaa ctgaattctc tggtaggaga ggcaccatct
15301 gaggtcacct aagaaactgg gaagtatttt tgctggaagc aagcttggga caagacatga
15361 gatcacagca ggcaatccac taacctcaat atacaaaaaa agaaagagat gtaagggtga
15421 aaggcagaaa aatgattgta tctctcatga ggatgacagg ccacaagtaa actgaggccc
15481 aaaagcttta cccaaggatg gaaccaatct cagaaaacca cacacaacaa atttaaaaaa
15541 ataaaccaa gaaaggggtg gctatgtcca agaacacagc tttaaagacc ccctagaaga
15601 agcaagagag acactagtaa aatcagtata aaacagcaaa aatcaataaa taaaaacaaa
15661 aataaatgta gaatggcatg aatcttgatt acaaagtgtc tttcctcatc aaagtaaaat
15721 ccaaaaagca caatcatttc aatgtaaaaa ataaaatcag acaagtctta aaagaaatac
15781 agctaagctt tggatgggag aagtttttct aacaaggcaa gaaactgaat gtcataaaga
15841 aatgattgac agattagact gtatgaaaca cagcaatttc tgtgtagcaa aaggcaccac
15901 ccaaaagaga caaataacac tcttgggagt atctataata tcacagacat ttgacacagt
15961 cgaatgtagt tcttgaaaat cagtaagaag aaaactaacc tgcaaataag gaaatgggca
16021 acagttaata tatgaatcag tctccaaaga ggaaatttat aaagtcaata aacatatgaa
16081 aacatgccca agaataata taaatgaaaa taataaactg ttcaataggc aaaaagatgt
16141 ttcaaaatgt gttaattcta atactgggaa ggttatataa aatcgggtac tcagggtact
16201 ggcgtatcct tcagaaagag tatactcaac aaaatacaaa aaaaaattta tctgacccaa
16261 tacttcaact actcgaagtt tattctagca agacaagcat aattggggaa gtacacaaaa
16321 atgtatgtac aaggatgttc atcatagtgt ttaYattaag aaaacaggaa gccaaaatgc
16381 ccttttagagg actgggttagg taaatgatgc tatgtattac agcagcaaaa acagaagaca
16441 aaaaaatttt ttgttaatta aatacaaaaa tcattatgca tatagcttag atctccttga
16501 taatacataa tgtatagtta cagaaaaaca gataccaaag tcttacttac ataaaactRc
16561 atgagtgtat gtataaacat gtactgattg ttttctactac agaaaaacta aagccacttt
16621 taatttggga gaaaaatttt taaaaggcat gagagcagct aagagattaa agacagagag
16681 gttagtgcag acagcgggtg acaccaaggg aaagagctgt ggaccttgct gtcctgaagg
16741 tttcaatatg gagcactgct ctccaggctc ctgcatccac caacacagaa gacagtaaag
16801 gaagtctcct gagacattag cagaggctct ggacttaggg gaccaggctc tagagtggca
16861 aagggttaga gcaaaacaca tgaaatggaa agttgatgta aacaaaacac agaccttcag
16921 ccccttctc cctcYgaggc ctaaaaagct gccaacgggg cttctcttcc tgtagtccca
16981 cctcacctca ggaaaaaaga ttaaagaaat tcttcatctg aagaaaatgc tgcttactta
17041 agcaccagc taacggctgt cagttgacaa gccatgtcaa caaggacttt cataatcaaa
17101 ttttgggtaca agactcttca atgtgaatgg acagcaaaaa aaaaaaaaaa aaaaaaaaaa
17161 tcagagattt gaaggaagcc tctaacatag aagacagagg ccaaaaatga acacataaca
17221 tgaaaaaaa aacattctga tgaaatacag aaaactgcaa agaaagtaaa caggattttt
17281 tttaaaaaga caaaaaataa gtacaagctc ttggaaatta atgacaccag aaataaaagc
17341 aatcagtaaa ggatgaaaag ctaaaattaa ggaaatcttc ataaagtaga acaaaaaaga
17401 cagacatgga taacatgggg agtcaaaaat aaagtaccgg gtcataatcc aggtgggtgt
17461 ggagaagggt cagaggggta ggggaggagg agaggaaaga aggtggagaa agaggataaa
17521 acaataaaga aactctaggc aaggaaacat actatacaat ttcagaacac cagggtaaag
17581 aaaagatcct aaaagcaaag tctcaaaaag gtcccRtttt gtttttttca gaaatctttt
17641 aggaggtaag cctctaaaat aaggaaataa atcaagaaag aggagaacac aggatgtggg
17701 ggaatctcag gatggcagtg gtccatcctg gagcaaRggg aaaagggatc cacctagtat
17761 gtgaggtctg acaaccagat gaattgtact cagagaatgt acaaggaaact gacaaaaagt
17821 ttaaagaaat ctgagccaat tagagatagt taacttaaga aaaaaataaa aacgagttac
17881 acaagaaaga aaatattaat gcatgctact tggcgcaaca aagatcaata tctatctggt
17941 cataataaaa acattaaagg tctatgttac caaaagtgt atgtgttaaa ggaggatgct
18001 aatgaggaag aggacacaaa agagctaaga accatcatct accagaacaa aacacaaaaa
18061 gatatctcaa aagagtgcag tacaataaca gagtttttga aaatggaggt aagtaccagg
18121 aaatacaggt aaaagagctg aaaactgtct tagggcaatg gaaaaaaaag atagaggact
18181 gctttattat tcacacaaat tcctctataa aataaaaatt agtttaaaag acacttaaaa
18241 gccaacccaga cagacaagct tagaaagaca gttctagaga cacctgaggt tgtcaccaaa

```

18301	actagcaaca	ctgttacatg	Raaatcaaag	aacagggctc	tgaagtga	caaaagccaa
18361	acctgaatct	taggtctgct	gcttagtagg	tatcagcttt	cccagattag	actctctaac
18421	tctcggaaaa	actcaaagga	tgctgtctgg	ccYgctgaaa	ttcaatggca	gctcagctat
18481	ttttaatggt	gctaaaatct	gaatctatta	atctgacatt	aaagccaggc	ataatgtaag
18541	tcaaaaaaga	caccagaagc	atccagcttg	ctaagttagg	caaattaatt	tgtagctaga
18601	ctctaattac	ccatgttaaa	ggtaattcat	ttctatTTTT	actattttcta	cactttactt
18661	tttctcttgg	ttttcaagta	aggttgaaa	ccttaaaaaag	aaatttgtgtc	aacctaatTT
18721	gtctacgcct	aaacccatggc	aggtaaaaatg	atcagaatgt	tcccccaaggc	tgtgtatggg
18781	ggcggatggt	aagagtcaga	gatagcgcac	Rcaaagaaaa	cgctcatgga	acagaaagcg
18841	ataggagtca	acaaccgaga	ggcagggcgc	tgaaatgaag	cttgaccctt	tcctcttaga
18901	atTTTccctc	acaggattta	gggtccccag	tcccccttgct	ttctttctgt	gtccaactga
18961	gatgttctgt	gatgtggcca	gccgcagtga	ttccccctgga	ggctctgacc	caagccaagg
19021	cctgccttga	acattcccag	gcgctgacaa	tgTTgttttag	gctattgctt	gaaacactga
19081	gaaattaccc	ctgttgctaa	acacacagaa	actatccctg	gccctgaacc	aaattccttc
19141	aacactcaaa	tcaactccct	caccttgga	acatcttttc	ctgctgtctg	ctgagaggac
19201	tgctgcagca	ctaaatgctt	ttgactgatt	accctgagat	ttagtgttct	ggaaccccaa
19261	ctagggtcgg	ggcagtcctt	tacaggaatt	cctctgcccc	tacttttagg	gcaacttcag
19321	ccacagggtc	agccagaagg	aacacagaag	atgggcttac	tccaatgata	tcctcatcta
19381	gacacttctg	taacttctta	tctcaatgga	ctactctaaa	tgacacagat	ggactactta
19441	tccatctgtg	tcaatggact	actctaagtg	acaaagatct	gtcctgggac	actgtacttg
19501	tatttgattt	ttagatgcaa	ccaaaagcca	atccaaatga	gaacatttgg	attgcaaatg
19561	agaacaaatg	gattggaaca	tttgatgga	aaacattggg	gcccattgtg	cgtaatgcag
19621	ctctggaaca	aaaatgggat	ggaatattaa	gtaacaagac	ttaatattct	cagggaatcc
19681	tggtctgact	ctgacaaaat	cagagaggtg	tttcaaaaag	ttctgaaaac	actggagtag
19741	atgcttatta	ttaataccc	caaatgactt	ctagaaccgt	taaagaactt	ttttgaagtg
19801	tatttgttaa	taaaaaaatt	ttcaatactc	agaatcacat	ttagggtcaag	ctttctaggt
19861	ccgatttctt	tctataagat	aaaaatgcct	aattattttac	tactaactca	tgcaagttcc
19921	tgagaaaata	gcaaaataac	tggtgctca	acattcacta	ttagagcttc	aatgtgcctt
19981	tggagggtcat	acattagctt	cagtttcttc	atcactttcR	ttatcagaaa	tgaaatgaga
20041	attgtgtcag	atgggtattta	tggttctttt	caactctaga	tggtacacac	catctaggga
20101	ataataactc	ctccccccca	ccattttcca	gaaagaagga	attctacctt	cttcatcaag
20161	tccaccgatg	atgttgtaaa	catagtatgg	aaagaagcgc	cttgaataca	ggattgtaga
20221	cagcattgca	gcaattgccc	ccgtagtcat	ggccttatta	ttggaatgct	tatacatctg
20281	caattattga	taaaagtcac	aggcatgtag	aggcagaggc	cattatagac	tagaacaatc
20341	aacagtataa	agtgaataaa	taaatgcata	ccacagtgga	aggggaaagc	atgcctatTT
20401	ccttcatgat	caaccaacac	agtattacta	acataaaaatt	ttaaagggaag	gaatgccaa
20461	tttgccctca	gctctctggg	ttagactcta	ttttccatac	cacccttata	tcagggtactg
20521	ctaattccaag	agctaattgtg	tatgaaaggg	cacatgaagt	ggcctaagga	agatgggttt
20581	aaatccatct	ctctccctca	ctctgcata	agaccagggg	tcaacaaaact	accctgttag
20641	tttggtcag	gggccaatc	cagcctactc	cctattgcta	tgaatattgt	ccgtggctgc
20701	tttttacta	cagaagcaga	tcaaagtagg	cccataaagc	tgtaaatatt	tactatctgg
20761	tcctttacag	aaaaattacg	gcaatccctg	atcaaaccta	gatgtaagtc	cctctctttg
20821	tggagcagat	ctctgtgaga	acagaagaca	cagggcagca	cccttactct	gcatgatttt
20881	aatacacagc	agtggtcgtg	atccttaaaa	catctacagt	agagaacaca	agcatccaaa
20941	acagggtctt	agcatgacaa	tacagtgact	gcaaatocta	gctttactat	acctttgcga
21001	gccctacatt	accactgggt	agagaaactt	cacaaaaaatt	ataaacataa	aatgaattca
21061	agatcaccaa	tttttgttaa	ccacatagca	aacatctcta	atgagaaact	taatggccag
21121	gcatagtggc	tcacacctgt	aatcccaact	gaggcgagg	aatgtttgag	cccaggagat
21181	gaaggctaca	gtgagctaca	atggcgccac	tgtactccag	cctgtgcaac	aaagtgagac
21241	gctgtctcta	aataaataga	cagatagata	tctaactagc	accgtaaaa	taaataatga
21301	cagtcaaaac	actgaaaaat	gattagaaat	gaactacaag	taacagggtaa	gttttttata
21361	gaggaatgcc	tttccaagat	aaaaactata	aaaaattatt	cataggccgg	gcacagtggc
21421	tactgctgg	cctgtaatcc	cagcactttg	ggaggccgag	atgggtggat	cacctgaagt
21481	caggggttcg	agaccagcct	ggccaacatg	gtgaaacccc	gtctctacta	aaatacaaaa
21541	attagacagg	ggtggtgaca	ggtgcctgta	atctcagcta	ctcgggaggc	tgtggcagga
21601	taatcacttg	aaccaggag	gcagagggtg	cagtgaagcca	agatcatgcc	attgcactcc
21661	aScctgggca	acaagagtga	aactctgtct	caaaaaaaa	aaaaaaaatt	tcattccatt
21721	tcatttcgaa	accaagcacc	aacattttatt	tacttcacca	cctaataaag	tatgagagaa
21781	aaacttcagg	aaggggtgtg	tattatgtag	aattcaccat	tccttgTTTT	attaacaata
21841	tcatgtttac	ttttgtcttc	taactcccat	ttataaaaata	agcattagga	attatcatat
21901	aaatatgcc	ataaatgtaa	gtcactatgg	ctttcaatgt	aagtttctaa	aaaagcatta
21961	acaattgata	aatactgagt	gaaatccttt	ctacacattc	aaaaagcatg	tgtcagttaa
22021	ataaatatac	tataactcc	agtaaccact	cataagtgtg	aataatctca	agtgttatcc
22081	atgaataggc	aaaacagaat	gtgatcacc	ctgacttctg	gcagctgggt	atcaactgaa
22141	gctggtcagg	tgacagacgt	taatgggtgca	tgTTgtgcct	cccatccaag	ctcccagctt
22201	attcattctt	tcgtatttct	actcatgcat	cctgccaact	aagagcacag	cactgtaaag
22261	aggaaaagct	tgtcaactga	tggtgatgca	aaccaagctc	ctgtgtcaaa	tccttcctgg
22321	gctctctcct	gccacagaaa	ttgatttgct	ttgtttttga	gggaagagta	tcctcagaag
22381	agaactcct	cccaggctcc	ttctaaaagg	gtagagaacc	cttcatatga	tacaagactt
22441	taacaaatgg	aatgtgctgc	tgtttcacat	tatgctactt	taatgaccct	gcattaatga
22501	tatcatttca	tttctagcat	acatttgtaa	ttcatctact	aacctagtga	ctctctagct

22561	atctgaccaa	cagtcattgct	gtaggcttaa	aagaatttaa	tgaattacta	ttaattttaa
22621	atagtgtaga	aatgtacaaa	agcatctacc	tttagtcttg	cttcaataat	ctttgtcagc
22681	gtaagacagt	ctccatgaaa	accgctgcat	ccaatgactg	ttttgtctgt	tctgtaaaaa
22741	gcacatttca	gaaaactgag	ctgggttagat	agtagagcaa	aacatatctt	cggcaatttt
22801	aaatttaaaa	ttctgattcc	cactattccc	taaatggtaa	tgggacaaac	agtcaccctt
22861	ctgggggagga	gggggtctgta	ttccatctta	ccccttattc	cagatgaatt	acagggtggat
22921	caaagacttt	aaaaatgcca	ctatgaatgg	actaaataaa	tcatgggtga	atttttttta
22981	ctatcttggg	ctgaggaaga	tacgtaggta	ggtaattga	ctgatttttg	agacggagtt
23041	tcgctcttgt	cacccaggct	ggaatgcagt	ggcgcaatct	tggctcactg	caacttccgc
23101	ctcctggggt	caagcaattc	ccctgcctca	gcctcccaag	tatctgggat	tacaggcacc
23161	cgccaccaca	cccagctgat	ttttgtattt	ttagtaSaga	tggggtttca	ccatgttggc
23221	caggctgggtc	tcaaactcct	gacctcaggt	aatccacctg	ccttggcctc	caaagtgtctg
23281	ggattacagg	tgtgaaccac	tgcacccagc	ctcgtgaagg	tagattttaa	caacacaatc
23341	caagggccac	acagaaaaat	ttcataaatt	tgactacata	aaattctaca	gggaaattta
23401	agaatagctt	tttaaaaccc	taagaaaata	tattagtagc	atctaMcccc	aaagtcta
23461	tttaattcta	taaaaattct	tacaaataag	gaaagcaata	acataaagga	aagatgggta
23521	acttctatga	acagacaagt	cacagaaaaa	agagacatta	agtcaccata	aacataagag
23581	cctctatgtt	actcagaaat	ccaaatctca	aaaagagact	atctcaacca	attatactgg
23641	ctaaaaatgc	ctaactaact	aaatgctggg	gaggttgtgg	aaacagtata	aactgattaa
23701	cctgttagat	gggcaatttg	gtgggtattta	ttaaaaattt	aaatacacac	cactctcacc
23761	aattctattg	ctagaaatcc	atcttgttaa	tatacttata	caagtatgca	aagggatgct
23821	ctagactcac	cagttagtac	tcatTTaaat	agcaccacca	aacaaaacaa	aacctaaatg
23881	tccatctgta	tggagaggat	taaaatttgg	tatagacata	caaattcaac	cgtgtatttc
23941	aaaaattaat	tcctagatct	tgatatgaat	ctataaagaa	acctaataca	tattttgcag
24001	aggccacaca	attcctcttg	gaaacttacg	aatgactcgc	acaaaccata	cctgtcctac
24061	taggagagca	gctgacacct	ctaggggtcat	cactaacatc	acctgatcta	tgcctaccat
24121	caacctcact	gcactaaggt	gaagacgtcc	aatccccat	aaggctttac	tgcctttact
24181	gacaagattg	gttgacaata	ccaacaggga	aagacagaaa	tcttagaact	tcaagatgct
24241	tttcccaa	atccagggtg	atcaaaggaa	tgggagtttt	catgcaaaga	atacagtctg
24301	aaacagggtt	ggaagaggca	agcttagttc	taggtcagMc	ccacaggacg	tgggatgagg
24361	gatataata	ggcattcgtt	aatgctgcat	tgttcttatt	ctctatctct	atatctgacg
24421	tgtttccaca	aaaaaaaaaa	aaaaagtgtc	cacttcacca	gcaaacgtaa	ctaaagcaat
24481	attttaaaga	tgagtaaaag	ctagtacaag	gatgggtatcc	ataaagtgtg	tttaaaatct
24541	tatttcta	atttactact	ttcaagtgtg	acaagtgtcg	tccttgagga	gaaaaaaagg
24601	taacacaaga	gcaccataaa	cagaaagcag	aaagggggta	tcaaaagatg	caagtggaga
24661	gaaacagaac	tgggaagacg	aaaacaaact	tcattgcttt	ttaagatgtg	ggccatccct
24721	aggagcagga	aagacaacgt	atcttttctt	ctgtacctac	ttcctacaat	acaaggaggg
24781	tccatccaaa	ggacctaaac	ctcgttaagtc	ccattccctat	tacaattcaa	gtttaattaa
24841	cccaggaatt	catgaccatt	tataagcatt	tccaaaactg	gtaaatacag	accactgccca
24901	atctgcagta	tgtattcag	atTTatgcag	gctttttgtt	tttttaagtt	ttggctttat
24961	tttcatgttt	taggaaaaac	atagctagcc	tattaaaact	gagctgtgga	cataattgct
25021	taggatattt	ctaaaacgaa	tgtttcaggt	aaaaaaaaaa	agtgtgggga	ggcagattta
25081	aaaaaaatat	catttaattg	attaatgggtg	ctgtgggttg	aatattccct	tcaaaactca
25141	tgttgaaatt	taattgccat	tgtgatggta	ctgggagttg	ggaccagggtg	tttaggtcct
25201	agggtctcagc	tttcatgaat	ggacattatc	acagcagttg	gttcgcttgc	tcttctttct
25261	ttctctggcc	ttccaccatg	ttaagacaca	gcaggaaatt	tttcatggta	aaatgctggg
25321	gtgaacacat	ttaggttacc	gaaagcactt	ttgggtaccct	gaatacagca	aatattatta
25381	agactgcaca	ttaaattatt	aggaaacatt	aacttagaaa	atgggtttct	aataaaaaatg
25441	ctcccaacag	caacttaaaa	actcatgaaa	caaatcattt	agaagtagaa	actctcacia
25501	catYaaatca	ttacaaaggc	attgtgaaat	gtcttttagaa	atatttactt	acaatttgta
25561	acatttgggg	ctatcccgcg	tatgaattga	aaacccttca	ctcaatcgag	tatcagaagc
25621	aacaattgca	aaatcttctc	cagcaattgc	cagtatagta	ctgaggaaaa	aagaaaaaaa
25681	ttaatctctc	agggtggtaa	tcctatccct	acaaatagaa	gaatgctcca	tagtacataa
25741	tgggataaaa	tactctagat	gtcaacaaaa	acatgattca	aatgggaaga	ggaaagatga
25801	gcgggaagag	aatgaacgcc	tggctacgag	ttgtctggga	aaaaaaaatt	attaataagc
25861	ctaaatcagg	gcaaagtctc	cctggcagga	gttaacagaa	aagccaatga	attatcatca
25921	ccaacacatt	aaatacttac	tcgcgcaagg	tactactaat	acagaacaac	taaataccac
25981	atctgtgccc	ttgaggatca	ggatatagaca	gtgggtactac	aacgcaagct	ctatgagttt
26041	agagaagatg	agattttttt	ttcttgcttc	atTTctttat	atccaagtcc	ttatataacg
26101	cctatataat	gcttatttct	ttatacccaa	tcccttatat	aatgacaaat	agatggacaa
26161	acagtaaaat	tttccctctg	tggctgtaca	atTTgacagc	ttatcaaaga	gacttacagt
26221	agaattccaa	aagcagaccg	cctgggttct	aattctgggt	ttcccgtttc	gcagatatga
26281	gactgtgggt	aagttacttc	tcaaagcgct	aatttcatca	tatatacaac	agagatcact
26341	gcagttgcta	cctcattagg	gtgttcaaag	gatcaaatat	gtaagccctt	atagcagttc
26401	ctgacatgta	actgggtcctc	tagtaagtgt	tagctataag	tgctatggca	ctggagtatg
26461	actaagcacc	tgggtctctg	aattacatga	gacagagacc	cactcttgct	acttactagg
26521	tatgtgatct	tggacaaatc	ctccaaatgc	aagttgatga	taacagtacc	tgtgtcacia
26581	ggtgtgtata	tatatTTggg	tgtgtatat	ttaatgtaca	aggcttgact	gataactata
26641	accactgctt	caatgcaata	gtggaaatta	aaggcatggg	gcctcacaga	cgtaagcact
26701	caggaaactt	aagccactat	ttttactgag	gagggatttg	tgctaaagct	ctcaagaaga
26761	aaaggatggc	attccaggta	atataaacag	caagcaatgg	caaacaggta	attattcaaa


```

26821 tagtacatac attcaagcaa ctcattcagg cagccctttt tgcataagca catgtagtga
26881 cgttaagggt tatgtgatgg acaggggtcc tactgtagaa aatcccaa at gccaagctaa
26941 agattttgga attttagcaa gaaatcatga aggtattctg agcaagaatg atctgtagtt
27001 gtaactactc aagaggctga ggtgggagga ctgcttgagc ccagggtgtt aaggctgcag
27061 tgagctatga tcgtgcctgg gcattagagt gagacctggt ctttaaaaaa ggaatgcaag
27121 agagagaaaa gtcccattta caaagtgggg ttttaggaag actgctctga caaYaacata
27181 gtatgtgaaa tgggacagaa acactgttct aatactacta atgcaatagt aaggtagcag
27241 ggtgaacagt aaatccaaaa tcatcacaaa cacacaaaat agacaaattt ttatatctac
27301 gcaaatgttt taggaactgg gaaaaccaat tatgacatcc aagatttaga acttagatga
27361 acagaatgat ggcataatta taagtatttt aaaggagagg aggcgggca cgggtggctca
27421 cacctgtaat cccaacactt tgggaggctg aggggggggg ggggggtcaa ttgcctgaga
27481 tcaggagttc gagaccagcc tggccaacat ggtgaaaccc atctctacta aaaatacaaa
27541 aattagccag gcgtgggtggc aggcacctgt aatcccagct actcgggagg ctgaggcaga
27601 aatgcgtgaa ccaggaggtt ggaggttgca gtgagctgag atcgaccgc tgcactccgg
27661 cctgggtgac agagtgagac tctgtctcaa aaaataagaa gaaaggagaa gaggagatga
27721 aggggaataa ttagcttgct tttgttttg ctgctgtctt tgagttgcc tgagagcaga
27781 aaaaccagtt aaaaatgttt tactgaagaa gccgaatcga gggactcatg agaggcagaa
27841 ctggaaaacc agatttgga gtaatcctcc cagcaatgag acatgaaaga gtgctgagcg
27901 ataaacaagg cggctaataga cttaactaca tttaaagaca gagtaggaaa agagaatgag
27961 gcctcathtt gcggaagcga aggtgcctg agagccagct gcagtaaWca ctaaagaaaa
28021 agaacaatga ctgagaaaaa gtaatcagaa agatctaagt aatttttagg gcagtaatgg
28081 cttaaactgg attacaaggg attaaaaagt gagtaacgag tagggcatac tgaacactga
28141 aaattcttat ttatagagaa tagccttacg aaacgggtcc aataaccctc cctacaatat
28201 acaacttaat tagtcatcac aggaagtgtt aaggtgtata atggaaaagc atccataaac
28261 tcagtgggtga aatagctatg aattaagtcc tggctcaact tcacaccagc tctctgacct
28321 tgacagttta acgtctaata taaccctagg atgctaatat catctaacat tcacttttca
28381 tgaggattaa ataagatgac agcttgcaat ttacaaaatg catctctctt gattctcacc
28441 aaaaactatg aagctactaa ggaagataag gaaatttagg ttcaagaagt tcagaagtac
28501 ccaaagtgtc ctttagtggtc agaaccaagg ctaaaatcag actttcgtta tctttctaac
28561 aactcccaa aatgtgcatt tataatttcaa atttatgagg aaccaattaa catttttgct
28621 ttgtttttta aatttathtt tgtagagatg gggctctgct atgctgcgca ggctgggtctt
28681 caactcctgg cctcaagcga tgatcctcct gccttggtt cccaaagtcc tgggattaca
28741 ggtgcgagcc acactgcca gccaatatht tctgttttaa gaaccatcgg ttctgtcaaa
28801 ttgcgtgtgt atattttaat gtacaaggct tgattggtaa ctataaccac tgtttcaatt
28861 tacagctctt ccctgtcaag agtcttaaac agagcatctt tctataacc taaatctctg
28921 gcgtgccacc acggaatatt atactactca agataaagct ggtaattaaa ataaaaacca
28981 aaacttgaac ataacataca agaacacaca tactaaaagg tccatcttct gagtattttg
29041 ttttcctgaa cttaagctaa acgttaaaaa aaaaaagcac ttatctatga aactaagttt
29101 gctcagccaa tcccaccttc tatttgaaat aaaacaaaat gattaaactg ctacaattag
29161 aaataacaga aatcaggcgg ctacaattag acatctcggc taccaacca gctatgcac
29221 taacaacaca gaccaaaca ccctaacttt taagtttcag acgctaacc tctaccctcg
29281 ccggctggca taaRaaacgt gtacatgagg tccagtttta atggtcttcc acagagcaga
29341 ggctatgttt caatttctac tttactgtct tacagcagca aggagcacgg agtgcggtc
29401 cacataaaaa ctcaaatgac atgactgtaa tgggaaaccc taaaaacca ggctgtatcg
29461 caatcaccaa gttaaacttga gcaaagcgag cctgaagagg gaaacacagg gcatgagagg
29521 acggcaggga gaccggcctt gtgcggaccc cctcagctca gggttctgag gcctgcagga
29581 gcccggggca gcgccatcac ggcgggtgact cctaaatagg cttcagcaga tgggggaagg
29641 gcgaaagtga aagccgcagc tctctgggg ttttaccctc cgttgaaaac gtagggcgaa
29701 aatcgagct gcaaagggcc cgcggctctg tgcggttcca tcccaagtc tctgccagSa
29761 gccgaatata tggctgtaga ggacaacatc gcacggctgc gcctgcggat ccgacacttg
29821 ctgtctcacg gcgagatggc tgccttgacc ggacgttacg ccacttccgg cttctcctga
29881 agttcgctcc cggcctctct atctcacgct agtcgttgct cctggagggc tgcacggcgg
29941 cttgtccctt tggtagttga atcccgcca ttccaaaag cgctgacagg gatgtaaagg
30001 gttttttttg tttgtttttt gtttttttcc cctcgaaga aaacattgga attcacccca
30061 atggacaaaa atttaagtct gaccatacaa aaaattgtc agaactatgg cgcaacggca
30121 actcgaataa cgggtgggaac gttaattgtc ctggctaata aaaaatgtat ataacatttc
30181 ctatccttaa agagctcaca acctcactga taataaaaag tacaagaaa acaagcagta
30241 taacatatga ttacgccaca atgaactaca gaagggaaaa tcaaggcgtg ctgaagtccc
30301 actaagaaac aactgcggaa agagccatgt gacaacagtg catgaactgg gagtggcaga
30361 actgaatata aatgcatgtg taaacacaag ctgtttgttt tgcttagtgt tccttgtcat
30421 tctacacgct tgaagatcag ctacgttct tgcagacagg taaggaggac gcgcttactg
30481 agtgccaagc actgctcagg cactgattct gtcaatctct gtcaatctcc cgacagccca
30541 agggtaagca ctgttatcat tattcaattt tacagaaaaa aaatgcgggg gagaggtcag
30601 gtaacttgtc gaaggtaacg ccgctagtgt ctttaaaaa caacaacaac aacaacaaaa
30661 cacactcaca catatacaca cacacgccat ttaaaaaatcg atctttccta cgtccagcaa
30721 gggccaatta gagatggctg tggcacggcg gccccgccc ggaactcctc aagagcttcg
30781 cccctcctta cctatggaaa cacaggaagt gacctatgct cacacttctc aYggcctcgg
30841 ccctagtggg agcaactcgc tgaagccgag ggcagaactg gcggaagtga cattatcaac
30901 gcgcgccagg ggttcagtga ggtcgggcag gtctgctgtg gcgggcgcct gggccgcggg
30961 ctgtttaact tcgcttccgc tggcccatag tgatctttgc agtgaccag gtaacagatt
31021 gtactctttt ctgacgggtt gggcgaaggc caccactgca ctgaggcctg ggggcaatgg

```

31081	tggggaagag	actaggaatt	ggcgcgcgtg	caggccccctc	gggggacgtt	cctcccccttc
31141	gtgctgccgc	cgttccggcc	tgtaacggcc	actcggccgc	cactcccgc	tggtgcccta
31201	ctctgctgtg	tttcgcaggc	agcttcccat	cgtacgattg	tggggctcag	ggtactactg
31261	gctggctggg	cggcggcagg	cgggacagga	cagtcccttg	catcgaagac	cctaagttaa
31321	ccctgccctg	tcctgccatc	cgcttcttct	ccatgttaga	agcagattca	cccagatctg
31381	tgcccgcctg	ttttgctgcc	aacattgaga	cttaaataatt	ttgtcagaag	cctgagacag
31441	cgggcacggt	agcgcttaag	atataataca	caccacttta	tttgcagggt	ctcccgtctc
31501	tcgggttcagg	ccatcatggt	tttccaaatc	tctaggtaga	cttttctgtg	aaaagactgt
31561	gcttcattta	gttatacaga	cactagaagg	ctatgcagaa	ttaatttgat	tgctccaaa
31621	aaatatcgga	tttgatgttt	caatttccag	gagatgaaga	taccagcaa	acaactcttt
31681	tctgaggata	aattagtga	gtaatcactg	tgcggtttct	tctgtagact	tacttgcaaa
31741	aagtggcctg	aagccaccga	aggtcctgga	taaatctcta	atcatactta	taatggcttt
31801	aaatcctgcc	gtcattatct	cttgccctcaa	ccttagattc	ctgaaacgaa	acttccgtcc
31861	tccagtttta	ctcctctcaa	attcatctag	tcttgccaaa	ttagatctgt	tcatactgca
31921	cttccgaaat	tccataactg	ttattattgc	ctatgcaata	acattgaaaa	ctcctgatag
31981	tatgagccca	ccaatatgtg	ctgtctcatc	tgctgcagtg	accttctata	cagtcatact
32041	aagcttggtg	cctgcatact	gcatgctttt	tcaatctgtc	tctttctgct	tgatttctct
32101	tttgtctgaa	gccctgatgt	gtaaattcct	actcaccttg	tgagacccaa	gttagatggg
32161	ccctgctttg	tgaaaacact	gcgctctctt	cacagtgatt	ggctgttagt	ctatatgtgc
32221	ttctcttcca	ggggtgtata	tgggctcatt	catgatcaca	tactgtattc	caggcatagt
32281	gctagatgca	gagatcacaa	agacatgtag	gctggtttct	gcattcaagg	aacttagctt
32341	agaccatacc	tgctgttata	atactatgtt	ttacagtagt	tatttgcata	cccttcatat
32401	tgaacacttt	gatgccagg	actatatcct	cctatcttta	tatcctcatc	tgaggacttt
32461	ctgttattgt	tattatagga	taactgtcaa	aaaaaaagta	tattttaaaa	aatatctctg
32521	atatatttat	ttccagaagc	agagcttgct	ttcttttttg	gtctgttttt	cagtgatgag
32581	tatgtaggat	agatagtctt	tgggggcctt	tgccctttca	aagtgatcgt	cagagtcttt
32641	catacattca	gcaaatactt	gagtgtctgt	tctgtaccag	cacatgcttg	aagtgcata
32701	gcctgaagga	tctttggaca	tataatttgt	aactttgaga	cctctaagtt	ctatgtgaga
32761	atatgttggt	ataaactcat	ttcagatgtg	tagtgagtaa	agcgatgatg	atttaagaaa
32821	agtcagataa	caggcacagt	ttgcattaat	gtgttctaaa	gaggtaagg	tattacattt
32881	ataaaaattc	agggtcttat	ctttgtgcgg	cttttttttt	tttaacagtt	tcattacagt
32941	aggagcttga	taaatgatca	ctctgaagta	tattggattg	aatttgatat	ttacttaatt
33001	ttttgcccac	gacattgtag	aggatgtaaa	attggaatat	ttaaagatct	aaactttgcc
33061	taacagtgtc	gtgtatacag	tgcttagtga	atattctgct	ctgatattac	attttgctta
33121	ggaattatth	ttctctaggt	gtttttcctc	aaaagtthtt	aatgctgggt	atgacagctc
33181	gatttttgagc	atthttccgat	tatttaaaaca	tgtaacaaaa	tgatttttgt	tttgttggcg
33241	atthttacatg	caatcgccgg	aaacatggaa	ggaataaaac	tttaggatta	taaggtaaaa
33301	acaaatgtat	tccaaaatag	cttcattgggt	tttcatgttt	gtgttttgta	tagccataga
33361	actggcttat	aggactgtac	aggttacctg	gatccttaaa	ttaaacttta	gacttttttc
33421	caaagcagca	tcactgtttc	ttggcgtgtg	aagataaccc	aaggaattga	ggaagttgct
33481	gagaagagt	tgctggagat	gctctaggaa	aaaattgaat	agtgagacga	gttccagcgc
33541	aagggtttct	ggtttgccaa	gaagaaagt	aacatcatgg	atcagaacaa	cagcctgcc
33601	ccttacgctc	agggtctggc	ctccctcag	gtaatatagc	aggagggaga	gaataggag
33661	ggcggaaatc	tgaactgcaa	gagatgggat	caaaaggcaa	ggaagggcac	ttaatgatct
33721	gtttttgaaa	atgggtttaat	atgtttttta	agccttattt	tggttgagaag	ttctattagg
33781	ctttgaaatg	gcacaatggg	gtttatthtg	gaagtctgga	agctaagtta	tatatthtg
33841	aaacacctaa	tctthtgata	aacacttatg	agaatgttcc	aatgacttat	atagggtctt
33901	tgattthtgaa	aatcacctc	accaaattat	tttctagttt	tattthtccc	ctthtacatt
33961	tcaagctctc	aaccacctat	ctactthtaa	aattthtcag	cctgggtgca	gtggctcacg
34021	cctgtaatcc	cagcactthg	ggaggccaag	gtgggcggat	cacctgaggt	caggagtctg
34081	agaccagcct	ggccaacgtg	gtgaaacctc	atctctacaa	aatatacaaa	aattagccag
34141	gtgttggtggc	gggtgcctgt	aatcccagct	actcgggagg	ctgaggcaag	gagaattgct
34201	tgaaccggg	agggtggagg	tgcatgtgagc	agaggtcgtg	ccactgcact	ccagcctggg
34261	agacagagcg	agactctgtc	tcaaaaaaaa	aaaaaaaaaa	aaaaaatca	ataactthtg
34321	ttgaaatata	catacaaaaa	aactcatttt	aagtgtctgt	tttgataatt	atatataatg
34381	tataaattac	agaacatttt	agttacctta	aaaagtcctt	tcttccctt	tatagtcact
34441	ctgctggccc	caggtaacta	ctgcatctgc	ttttcaatgc	tgaagattag	ttttgtctat
34501	tctagaattt	catatagatg	gaatcagagt	gtatgctttt	ttgtgtatgt	ctgacttctt
34561	agcccagtgt	actgtthtgta	tatcagtagt	taatccattg	tatagctaag	tatcactcca
34621	ttgtthtgat	gttccacagt	tcattccattc	tccagtgtgt	cacatttggg	gtctthccag
34681	tttgagagcta	ttgcgaataa	aagcactgta	aacatttgtg	tagactthga	atgcactgtt
34741	tttacttctc	atgggttaa	acttaggagt	aggattgcta	ggctctatat	tggtatatgt
34801	ataactthtat	aagaaactgc	caaactgttt	tttgaagtgg	ctgtattgtt	ttgcagcata
34861	agagattthaa	gttgctccac	atcctcacca	acactthctg	ctgtcagtct	ttttactthc
34921	actctagtga	ttgcttagta	gtatcttatt	gtggthttga	ttthtatttg	cctgattact
34981	aatgtthctg	agcacctthg	caagtgtctg	tcagccactc	atacacaggc	ccacctcact
35041	ttactgcact	tcactthact	gcatgtthga	caaattgaag	gtgtgtgtaa	acctgtacct
35101	agcaagtctg	ttggcattat	ttttccaaaa	gtgtgtactc	acttcatgtc	ttgggttag
35161	atthttggtaa	ttthttgcagg	atthtcaact	ttthcattat	tatccgttat	tgthtcaaaa
35221	ctthtttttt	tctthttttt	tgtatthttt	ttthtaattt	ttthttcagt	cactctgttg
35281	cccaggctgg	agtgcagtgg	tgcatgtctg	gctcactgca	aactccatct	cccgtgttca


```

35341 agcgattctc ctgcctcagc ctcccaagta gctgggatta caggcatgcg ccaccacacc
35401 cagctaaatt ttgtattttt agtggagacg gagtttcacc atgctgggtg caaactactg
35461 gctgcaagtg atccatccgc cttggcctcc caaagtgttg ggattacagg catgagccac
35521 tgtgcctagt caaacctttt cattattatc tgttattgtg atcagtgatc tttgatgtta
35581 ctattgtaat tattattgaa tgccataaac tgcacctgta taatacagga acttaattga
35641 taaatgtctg cagcgtgacc aaccattccc ccatctctct ccctctgctt ggtcttccct
35701 attccttgag acacaacaat atggaaatta ggctaattaa taaccttaca gtgactttta
35761 attaatgtgt cagatgaagg gaagagctgc acatctctca tttgaaacca aaagctataa
35821 atgattatac ttagtgaaga aggcattgtg aaagctgaga caggctaaaa gctaggcctc
35881 ttgcacccaa tagttagcca agttgtgaat gcaagggaaa agttctttaa ggaaattaga
35941 agtgctactc cagtaaacc ccaagtgata agaaagcaaa acagccttat tgcttatatg
36001 gagaaagttt gaatggtctg gatagaagat cataccaccc acacatcccc ttaagccaaa
36061 gtgtaataca gagcaaggcc ttaactctct tcaattctgt aaaggctgag agcggagagg
36121 aagctgtaga agaaagtttt gaaactagca gaggtttatt cagagcttta aggagagagg
36181 ccttctccac aacataaaaa tgcaacatga agcagcaagt tatctggaag atctagctga
36241 gataattgat gaaggtgact atactaaata atagattttt aatgtagatg aaacagcctt
36301 ctactggaag aagatgctat ctaggacttt tatagctaga gaggagaaat cagtgcctag
36361 cctcaaagct tcagaggact ggctgactag ttaggggcta atagagctgg tgagtttaaa
36421 ttgaagccaa tgctcatgtt ctgctctaaa accatagagc cttagaattt acgctaaatc
36481 tactctgcct gtcctcagta aacagaacaa caaacctgta tgagagcacg tctgtttaca
36541 gcatgattta ctggatattt taagctcttt gagatctgct cagaaaaaaa gtttaatttc
36601 aaaatattac tcaactgacag tgtaactagt tgtccacaag ctctgatgga gaagaacaag
36661 gagattaata ttgttttcat gcctgcttaa ataataatc cattcttcag cccatggatc
36721 aaggagtaat ttcaactttc aattcttact atttaagaaa tacagcaggg catggtggct
36781 catgcttgta atctcagtac tttgggaggc caaggtggaa ggatcactca aagctaggag
36841 ctcaagacca acctgggtaa caaaacaagt ccctgttgct acaaaaaaaa atttttttt
36901 aattagctgg tcatggtggc atgtgcctgt agtcccagct acttgggagg ctgaggcggg
36961 agggtcactt gagtccagaa gttaaaggct acaatggaga ccctgtctca aagaaaggaa
37021 gcagggaggg acatatgctg tagctgccat agatagtgat tctctgatg aatctgggca
37081 aagtgaattg aaaaccttct gaaaaagatt caccattcta gatgccatta agaattgtca
37141 tgattcatgg gaggagggtg aaatatcaac atgaataaga gtttggaaga ggttgattcc
37201 aaccctcgtg gatgactttg agagggtcta gacttcagt ctggaagtta ctgcagggtg
37261 agtggaataa gcaagtgaac tagaattaga agtgaacctg aagatgtgac tgaattgctg
37321 caattttttg ataaaacctg aacagatgag gagttgcttc ttgtgagtaa gcaaagaaag
37381 tggtttcttg agatagaatt gactcctggg gaagaactga tgactttaga atattacata
37441 aacttagttg ataaagcagc agcagggttt gagaggattg actccaattt tgaaataagt
37501 tctagtgtgg gtaaaatgct gtcaaatagt atcatatgct acagagacat cttcagtga
37561 aggaagagtc agtcagtgtg gcaaacttcg tcagtcttat ttaagaaat tgccacagct
37621 accaccctga tcagtcagca gccatcaaca tcgaggcaag atcctctgtc agcaaaaaa
37681 ttatgatttg ctgcaggctc acatgattgt tagcattttt agcaataaag catttttaaa
37741 ttaagttata tacatattat tagacataat gctattgcac acttaataga ctttagtgct
37801 aacataactt ttgtaggcac tgggaaacca aaaaattgat gccgttgct ttattgagat
37861 ggtctggaac ctaacctgta gtatctccga ggtatgcctg tatcttcatt tgtaatatgt
37921 ccttcacatc ttttgccctt ttttattatt ttatttggtg atcttctttt atggagttgt
37981 cagagctctt tattattctg tttaccagtc ctttctcaga tgtatgtatt atagtatttt
38041 ttttcccagt ctggcctgoc ttttaatttt ctcaatgggt tctttcaaag aacagaagtt
38101 ttttaatttt ccgaagttca gtttatccat ttttcttcat gtttatccac tgtgtggtat
38161 taaagaagaa agcaatgtgt ataagaatag ctggttcttc cgtaattaat gtttaataac
38221 cccattattc tccgaaggca tctgtctttg cacacctgac ctgctgttcc accaagaaag
38281 ttccacaaac acttagcagc agccagccta acctgttttt ctccttgctt tccacagggt
38341 gccatgactc ccggaatccc tatcttttagt ccaatgatgc cttatggcac tggactgacc
38401 ccacagccta ttcagaacac caatagtctg tctatttttg aagagcaaca aaggcagcag
38461 cagcaacaac aacagcagca gcagcagcag cagcagcaac agcaacagca gcagcagcag
38521 cagcagcagc agcagcagca gcagcagcag goaacacagg gaacctcagg ccaggcacca
38581 gcagccgttc agcagtcaac gtcccagcag gcaccttgc cgggcaccac tccactgtat
38641 cagctcttcc actcacagac tctcacaact gcaccttgc cgccagcttc ggagagttct
38701 ccctccccc a tgactcccat gaccccatc actcctgcca cgcagcttc acttaggagt
38761 gggattgtac cgcagctgca gtgagtactt cgtgttttat gtttctctcc acttaggagt
38821 ccctttgagt tatgttctct ctctgttttc agatggatcc ttttattaag ggaggagtg
38881 gcactaacgg taattgtgta tcaaaatttg ctttatctca catttgggaa agggaagcaa
38941 agctatctta gtcagtgtcc tcagtaaaag gctcttaaca ggtttagaaa tgtggtcatt
39001 tgtgtttaca tacctgagcc aataaaattt aatctgactt tcaactgctg tattattata
39061 ttatagacat ttccctgtat ctgatatcgc taaatcacia tgttaggtag tctctttccc
39121 ttatgctatt ttaggtcttt agtcacaata tcagtataat ttctggtagt tcttggtttt
39181 tgtttttact atgggtgctg catataaatc tttgaagggt tgtgtccttc ccacaaaatg
39241 aagacgactg tttttgtcat aaatggattt ttctacctaa atgaagtggg ttctatatgt
39301 aacagtgtag taggggtagg aaataatttc atcttcttga aaaaccagca aatatttcca
39361 aataattcca gtcaataaga agtgtatagc ttttcatttt agaaagctta tgaccaaatt
39421 aaaaggttac ttgcagtctc tgcactctct cagttttctt gtacagatac cttcctcctt
39481 catactccct ttagatctag tatttccctat ttgcatttat tcacctgtt acatatatgg
39541 ttgttggtta taagctatct ctcatcattt ttggaactaa gtggtgtgta atcgtggatg

```



```

39601 ctgacttttca cccaaagacc taaatcttgc ctccacaatt ttgttttgacc ccacacacaa
39661 ttttaaaaac aaagtaattt tagtgatttt agagagagcc ctttttagct cacccttgct
39721 tataccactc ccatgtgtcc agcatgcttg tctgactccc aggaatattt aagtttgcat
39781 ttctgattta aataataaat tataaacagt acagtcaggt gtttgtttct tgcgagtgcc
39841 tttgctgttc tgatactccc cagagcatcc agtcatccac attcctgaat ttccactatc
39901 tactaagaac cctcccgggt ggtagttcag tgccctctcc atcttgtagg cttaagaggg
39961 attaaggtaa atattttaatt aatgaaaata tataagaata catttaacaa ttatgtgact
40021 aaagtgtgta tagatatact aaaatctact tggatatagt cataagtgga caaatgctaa
40081 aggcaggtgt gtatacaagg gtgattggaa ggaaatagat gatatggaaa tgaaaacatt
40141 cattgtgtgg atcaacctaa ttggctttac agttgtgtat catagactgt acaagaaaaa
40201 gaaccagaag caacaatgag ctgaaacctt ttgtatttga acctatgtat ttgaaatctg
40261 gactcgatat tcttgggatg gtgatttcca ggtccatgcg agacagttgt tgagcagtta
40321 attgcattca aagggcattg cccatttcaa ctatatatac tttcataagc agaaaaatgt
40381 ataataaaaa tgtgggtttg ttgttttaaa ttttattaaa atttctaata gagttgcttt
40441 ttagtatatc tttatccttg tataagttat tcgttaagtg atttaagaac actgagaaat
40501 gaaaagggtc agtggaccca gatggctcca tttatcctta tttactgaga gtttaattaga
40561 agagaaagca gggttttgcc tttttttttt gctaaagaca cttagctctt gtttttcaaa
40621 agatacttac tttgagagaa ctgggcagtt catgcctgct tgttttcatt ataaatagtt
40681 acttaggaat aggggtggtg ttgtagcttt tcagagctca cagatgagaa ttgagtttgt
40741 ctgtgagaag gctaaggcca ggctctggag acagacagac tcaaactctg gctcctccac
40801 ttgggagcca ttgctcctg agcaagttgc actctacctt taagcctcag cttatttatc
40861 caaatgtggg aatactggta acttctacct cagtgcgtta tatgtattaa atggaataat
40921 ctatataaaa tgctcaacat gtgcatgata cttgttaaac aataaatgtg agcaattaaa
40981 aaaaagtaaa gcctgggtga aataatcaga tgtctgcata atttctaacg cctcatccaa
41041 tgaaacttaa gtaattttaa tagtcgtgtt ttctttttta atctcttaca gaaatattgt
41101 atccacagtg aatcttgggt gttaaacttga cctaaagacc attgcacttc gtgcccgaaa
41161 cgccgaatat aatcccaagg ttagatctat tttaatgtat ttcttttttt tttctttttt
41221 gtctcctctg ccgtgtctct atatttttaat gtatttcacg ctataaaaca aatgtctgta
41281 gatcaggcca ggcacagtgg ctaatgcctg taatcccagc actttgggag gctgaggaag
41341 gagaatttct tgaacctagg agttcaccac cagcccaggc aacatggcaa gaccctgtct
41401 cttaaaaaaa aaaaaaaaaat tggccgggct tgggtggctc cacgtgtaat ccagcactt
41461 tgggaggccg aggtgggccc atcatctgag gtcaggagtt caagaccatc ctggccaaca
41521 tagtgaaacc ccgtctctac taaaaataca aaaatttgcc gggagtgggt gcatgcgcct
41581 gtaatcccgg ctacttggga ggctgaggca ggagaatcac ttgatcctgg gaggcagagg
41641 ttgcagtgag cggagattgc gccattgcat tccagcctgg caacagagcg agactccgcc
41701 tcaaaaaaaa aatctgtata tcaaagagtt tgtgttatgc ttattccttg acaccaataa
41761 aatgaagatc taaagtaaaa tgtgcattgt tttgtatctt ttattgagtg tctgtgatat
41821 aagaatccct gggagtacag cagtctataa aataagctaa gttatatatg tattgtattg
41881 ggatcatgtg aagaattttg tatatgtata gggatgatgt tagccagcta tagtaggcaa
41941 agtaatttgg ataaacatta gctgggttga gagaaatgtt aagtaatgga cttaggggtg
42001 attttaaaat ccctgaaaca taatgcctga gatctgaaag acagctaagg gtctgaaaat
42061 caccctttta cactcataa tgagtctgta tgacatgtag cattctaaga attaatcttt
42121 catctattat aatcacattt agttgaatac ataattttat tactttacgt tcttaagtga
42181 tatttaacca ataaaaatag tagaggaaat tctggaaatt caaaatagct aggcttttcc
42241 tgggacgtat ataaactact atatactgct agcttttttt gatgttgata aaatcacagg
42301 gaagacatag agcagggttt aaactaaaat tgttaaaagc caggcatggt gactcagacc
42361 tgtaattcca gcactttggg aggccaaagg gggaggatca cttgaggcca acagttcaag
42421 acgagcctgg gcaacatagc aaggccttgt ttcatacaga aatttaaaaa attatctggg
42481 gttggtggca cacacctata atcccagcta cttgggaggc caagacagaa ggatctcttg
42541 agctcaggaa ttcgaggctg cagtgcagcc tgattgcacc actgcactcc agtctgggca
42601 acaaagtgag actcttgtct ctaaaaaaa aaattaataa aataaaaaaa taaaatttgt
42661 aaagcaatct agtttgtcaa agagtcgtct taattagaaa catgtagggt tttattgtat
42721 aattaaatgt attaaaatat ttaagttgtt tcaaagtaat tatttgcttt ttatcatgta
42781 cctaataact gaggccatta attcaaccca cagttgaaat ttttcccct tgagttacca
42841 ccttagcaag aaaattttct gaaagaatta acatgtttca agcataaaaa gcagaaaata
42901 aaagttaaaa ctgtgttttt ttccctaatt gcatttatgt gtttaataca ttaatatgtt
42961 ttctaaagac caattgaaag catgatttta cttcattacg tattgatagg cttgtaatct
43021 gattttattaa ttccattaaag gtagaaaagg tttattgggt tatttgcttc aagcagcaaa
43081 ttaataaaaac aaaatgtatc agagaagcta tagtcatgat aagcagcaaa ttgcaaacat
43141 aaacagaagc acttgtattt attgagaaca taaccaaat ttgcacaat tgattatttt
43201 ggaatgctca tgtgaaagaa catacagatt tgggtataact tagtcacaat tgacaaatcct
43261 ctgctcctta tgcaaaggaa tatttggttac atgtggtgta tgcaaactcct ttacagatat
43321 acagaaatac agaacaaata ttttgataac tagatgtact atgtccttcc taccagttgt
43381 gattttttttg tcaatgggtg gttcgcctaa caacattgag cagtttggca tgacctcact
43441 aatgattctc tctgaccatt gtagcgggtt gctgcggtaa tcatgaggat aagagagcca
43501 cgaaccacgg cactgatttt cagttctggg aaaatgggtg gcacaggagc caagaggtag
43561 ccgtaagaaa ttcattcttc tgggtctatg gttatgaatg aaaaggtgat atctcattgt
43621 ttttaggtta ttaggttagc actttaacat gttattattg ctttcttata aaaaccattt
43681 taatatgatt ctattaatta tttttattta tttatttatt atttgattct attaatgtta
43741 gatagcagtg atttcatttt cttaaaaaatt agatatgggc aggcgtgggt tctcaccaag
43801 gcgggcaaat cacttgaggg caggagttcg agaccagcct gaccaacatg gtgaaactcc

```

```

43861 atctctacta aaaatacaaaa aattagccag gcgtggtagt ggatgtctgt agtcccagct
43921 acttgggagg ctgaagcacg agaatcgctt aaatccggga ggtggagggt gcagtgcgct
43981 gagatcatgc tactgtactc cagcatggga gacagaacaa gacactttct ccagaaaaaa
44041 gaaaaaaatt aggttaagatg taatacaaca tcagaactat taataaaaatt ccctttatgt
44101 gaaaaatgtt gtaaataaca caaatacatc ttgaaatgga agaaaaaatt gatcaagaat
44161 taaaacactt ctaagctaata ggtgtaaggg ctttgcagac cttattgggc ctggcagcgt
44221 gacagcatca catgtgttgg ctgcagaaac ctgccttctc actggaacta gctttcatta
44281 atagtgtttg agttgtgcag atcttaagga atgcaccctt gttataaaat gtcattgcct
44341 atattctcca tctgaagtga tcctgtctga aggttagtac tctgcggccc tgactgttct
44401 aaacagagct tatatacttg gtagaagtca aaaactaggg ggaatttag tgacattagc
44461 ttcataaatg aactgaacaa ataaactaaa acttttttaa tgaaagagta tKaaatgtac
44521 ttggagggtat caacacatag aagggggctg tggatatttt tgcttattct gaagtgtgaa
44581 attgtctttc agtgcagggg atgccattgg tgtggacatt ctggctcctg atctccgagg
44641 tttttcagaa tgcaggacaa ggatgtgttc ttgcctttca ctccctctg gccacaacat
44701 gcagtagtaa cctctttaat taagagcgtt tttgtttgct tgttttcccc tgcatggaac
44761 atcagaaact tttggtttat caaggcaagc ttttcatgca gcatttagcc tttttgtccc
44821 agagcatctg aaaactgaat attgtatatS tagttggatg actatttcat caagacaaga
44881 aaccaccaat acatttacct gaaattttaa agcgtagcat atatatatat gcttgatttt
44941 tgttcttcct gatccctctg acctgatagt ctctttatgg taatattttc acattctttt
45001 ttgttgttgt tgttgttttt gagatggagt ctgcctctgc gccaggctg gagtgcagtg
45061 gcatgatctc ggctcactgc aagctccgcc tcctgggttc acgccattct cttgcctcag
45121 cctcccgagt agcagagact acaggtgccc accaccatgc ctggctaatt tttgtatttt
45181 tagtagagat ggggtttcac tgtgttagcc aggatggtct caatctcctg acctcatgat
45241 ccgcctgcct cagcctccca aagtgttggg attacaggtg tgagccaccg tgcccagcct
45301 gcctgcctgc ctttttctct tttatttttt ctttttttct cttctttctt tctttccttt
45361 tctttttttt tttttttttt tttttttttg gtggagtcac ctaggctgga gtgcagtggt
45421 acaatcttgg ctactgcaa cctccacctc ccagggtcaa gtgattctcc tgcctcagcc
45481 tccaagtag ctgggattgc aggtgcctgg caccatgccc agctaatttt tgtattttta
45541 gtagagatag ggtttcacca tgttgaccaa gctggtctcg aactcttgac ctcaggtgag
45601 ctatccgcct tggcctccca aagtgcctgg gattagaggc gtgagccacc atgcctggcc
45661 cacattctgc ttttcttatg taagctctga actgctaagt cgtagtttat tcaacaaatg
45721 acataggaat gtctattcat gatgagtctt ggtataaaag aggatagaat tagtgaatac
45781 attgttcaat aataaatctc atcaacattt tctgatcaaa atgaagtttg ttagttttcc
45841 tctcagtaga aatgcaggg ctaaaataca gaaatagtga tgaYtgatga tgggtgataat
45901 tcacatccat aaaatctagg gctacaataa tttggcggat tgaaaggtca ttttggcagg
45961 cctacagttt tctgtcaagg atccaggaat actttataag gaattgtgaa tgctgtcag
46021 tcttttctcc tattgcaaga aggtgacca gtttacactt tattagttta ctgttttggg
46081 ctttttataa gttattagtc taaataagta ttttagctgg ctctgagtat gaataactca
46141 ctttttttct tttcttagtg aagaacagtc cagactggca gcaagaaaat atgctagagt
46201 tgtacagaag ttgggttttc cagctaagtt cttggacttc aagattcaga aRatgggtggg
46261 gagctgtgat gtgaagtttc ctataaggtt agaaggcctt gtgctcacc accaacaatt
46321 tagtaggtaa gtctgaaatg tattRtgatt gttattggca acagttcatt tataatctaa
46381 acattgttca gaataaaaca catgcaaaat attcagtata tgagaacagt tgacatgggt
46441 atagtgttat gtattcttgc attgtcttcc tgatgttctc agtcatattt atcacctca
46501 ccagcctctg ctcccttat cactttgcgg taccataaac tcccctttac tggaatgaat
46561 ttgattctac ttctgtatgt tttatcgttt tattgctgaa tacacttgga atgcatgaat
46621 tgaccctaac ctgtatcaa ttttttttcc cagtttggat ctctcttttt agtcaacatt
46681 gtgtcagatc taccagcaaa gtgtgaagtt gagcgatagg aacaactttc taattatctt
46741 ccctgctact tgcaggtgaa gactcacagg caggcagccc tgcccacctc actgcttcat
46801 ctcatgggtc tctgggtgtc gttcacaggc acattagttc tgtgtgcccc tggggctcac
46861 ttgggtccct ctgccctagg cctttgcact tgccactttt atgcctagta tgctcatttc
46921 ctttttcacc taggaagctc ccacttgagt tccatatgtc taccattcc actcttcctc
46981 agagaagcct gtcctgaatt ttgtcttagg tcagacacac agaaacagag gcatcctgtt
47041 ttcagctctc ccgaactgag aaaaatgaga ttactaggct tagaagaata tgtaccaggc
47101 ctggcctggg ggctcacacc tgtaatccca gcattttggg aggcgaggc aggcagatca
47161 gttgagttca ggagttcaag accagcctgg ccaacatggt gaaacctcgt ctttactaaa
47221 aatacaaaaa ttagctggac atgggtggtg atgcctgtaa tcccagttac atgggaggct
47281 gaggcaggac aatcattcga acccaggaga tggagggtgc agtgagccaa gatcgtgcca
47341 ctgtactcca gcctgggcca cacagcaaga ctccgtctca aaaaaaaaaa gaatatatac
47401 caatagtcca ttcagtcaga cagcttaatc aggtataggt taattctcag gctagtatat
47461 aagtttgatt aaatttcctg accacaattg tcagctagag aatatttcaa ttttaaggagg
47521 taagatatga ttaaaagtta aactgtcagt attggatctt agaagtaaat gattattagg
47581 actgtaatag taattattag gactgtaaaa gttaaaggatt attatctgca ttagatatca
47641 ttatatctaa tgatatagag actgcagaca taactacagg gctctttttc ttaaatcaga
47701 aaatccagat tcaatagaaa tagggtaaa tgataggagg acaaatagcc ttccatccag
47761 tggttatcaa ctgacgacta caagtcggcc tcacttgctt taattattct attctatcct
47821 ttgatgctgc ttgaagaact gtgttttacc tcttgactag tttgtttatt cagtattttt
47881 ccttgtagag gtcctcattt tatctaaaag cacacaaagc tcttgatttc taaacttttt
47941 gcaattttcc ttctagttaa gagccagagt tatttcctgg tttaatctac agaattgatca
48001 aaccagaaat tgttctcctt atttttgttt ctggaaaagt tgtattaaca ggtaagttgt
48061 aacaggaagt agtatctgaa agtttgaag tgttttgagt atggcatttt ctcagtgctg

```



```

48121   aaaagaaatt tcagtgttcg gacagtgggc tagcttcttg tacaaaggcc tcccacccaa
48181   agtctgatga gaaacgtgcc cactaaaggc acagtgagag caggggaagtc tgaccacagc
48241   tctgcaagca gacttccatt tacagtgagg aggtgagcat tgcattgaac aaaagatggc
48301   gttttcactt ggaattagtt atctgaagct ttaggattcc tcagcaatat gattatgaga
48361   caagaaagga agattcagaa atgagcttag ttgaaggcag caattcagag aagaagattc
48421   agttgttatc attgccgtcc tgcttggttt atggcctggt tcaggaccaa ggagagaagt
48481   gtgaatacat gcctcttgag ctatagaatg agacgctgga gtcactaaga tgatttttta
48541   aaagtattgt tttataaaca aaaataagat tgtgacaagg gattccacYa ttaatgtttt
48601   catgcctgtg ccttaatctg actgggtatg gtgagaattg tgcttgcagc ttttaaggtaa
48661   gaattttacc atcttaatat gttaagaagt gccatttcag tctctcatct ctactccaac
48721   ttgtcttctt aggtgctaaa gtcagagcag aaatttatga agcatttgaa aacatctacc
48781   ctattctaaa gggattcagg aagacgacgt aatggctctc atgtaccctt gcctccccc
48841   ccccttctt tttttttttt taaacaaatc agtttgtttt ggtaccctta aatgggtggtg
48901   ttgtgagaag atggatgttg agttgcaggg tgtggcacca ggtgatgcc ttctgtaagt
48961   gcccaccgcg ggatgccggg aaggggcatt atttgtgcac tgagaacacc gcgcagcgtg
49021   actgtgagtt gctcataccg tgctgctatc tgggcagcgc tgcccattta tttatatgta
49081   gatttttaaac actgctgttg acaagtgtgt ttgagggaga aaactttaag tgttaaagcc
49141   acctctataa ttgattggac tttttaattt taatgttttt ccccatgaac cacagttttt
49201   atatttctac cagaaaagta aaaatctttt ttaaaagtgt tgtttttcta atttataact
49261   cctaggggtt atttctgtgc cagacacatt ccacctctcc agtattgcag gacagaatat
49321   atgtgttaat gaaaatgaat ggctgtacat atttttttct ttcttcagag tactctgtac
49381   aataaatgca gtttataaaa gtgttagatt gttgttatac cttgtaagag tcatgtgatc
49441   atactgtttt ctacaaagtt gtatttttaga tataatgcct gaaaccattt tgggtgtttgc
49501   ttcagtcagt atttcattgt atgctgcaat gaaaacagat taatgatctg agaaccctcc
49561   atatatagag caactcctgt tttctaggta ttttgcatac aatgcctgga atcctcacia
49621   agcttcagtt acgttttgtt cctctgttgg aggtgaggag ataaggaagc cccagctgag
49681   ggacttggct gaggttacac agctagtaag tggtaaaaat gagtgaagtc ttcaggtgta
49741   gaagctgggt ccctatccac aggtgcgcaa ctctctgcag taactttttt ttgcttgttt
49801   tgcagttttt ttctcatgga ctatcagggt gacatttgtg ggttcttagg ttttattgtt
49861   agagtggttt gttgttttta attgtaaaag tacatcttca gctgactcag gaataaaatc
49921   agaaagggga ggtccttcct tcctttctct tctgcctctt tccccaagat aacgaccaga
49981   ttagtgggta tcttctaagc cctgttctgt ctatcttctg ggcattggcat ttgatcccat
50041   ttttgaaaaa aagaaataat acattcaatt ttatagcttt cccctttttc agtcaatata
50101   tcataaacct atttccatga ttgggaatct aggatactct tcttaggtac cttcacttac
50161   tgagctattc ctgtaattat ggtcatttac atgacctcta gtttttcaat atcatcaaca
50221   gcgctgcagg gaacatcctt gtatgtgtat ttttcggatg agtgcaggta ttcattgtagt
50281   aaactttcct agaagaggaa cttaaagacta tacattctga gttttaatca gttgatacca
50341   gattgcagtc caaagagaac ggtgcattgaa atgccccttt cttgcatttt ccaatcattt
50401   gtgatgccaa taatgtatgg attaatgga aagacatcat tccaatatta tctcctatct
50461   aagaaagaag tatctcttca tgtatgtagg tcttatgttc ctcagtaaag ttttgtactt
50521   tttttcacac agggctttta tatttcataa gtattacttc cttaattcct aagtatagta
50581   tcatttctgt tttattactg gaagtttttc ctaacacttt aaaagttatt gttgataata
50641   tttttcttat tccgagttta ctgaactcct attactgctg atttagttga ttgcattgaa
50701   agttctaggt atgtaatcat ctgtaaatag taattttatg ttttcctttc caacatttat
50761   ttttcctatc agtgcctagg actttaatgt atataactta aaaaaaacat ctcttagagt
50821   tgtagctaca tatacaggaa atctaacaaa tgtgtagcat aatgtattat acaaaggcag
50881   acacccttgc agccaccaac aaggtcaaga aacaattttg ctgcctgtcc tagaagcccc
50941   tccttatggg cctatccaga cacacacttc tggcttccct caagcagtga ctattatcct
51001   gactctcacg catttaaaga taattgaagt tctctgtcca tctcttttct tccaattta
51061   caggccattt agtgtgtaga gcttctcata gtctgggggt tgctagttgg aaattcatgg
51121   tgtagtttcc ctattctctg tatttcctgc aaattggaag ctgctgtgta attcctagat
51181   ctattaattc attagtgggt tgcaaaatga catttttagt atttcatttc tttttcattt
51241   attaatattg atacttttat aaagtgttgt gctccatata gcagaatact ttcccctttt
51301   aagttttcaa gataaaatga gttcatatta atatgtccaa ttcaaagctc atagggttat
51361   tttaccaatt gtatatccaa ttcaaattca aagcttatag ggtttttatt taaccaattc
51421   tgtattacac tcttccttct aactgagaa tttttaattc ttaagacat aggggatgag
51481   gaattagaat gtcccataat tactcattta ctttacgtat ttactttatc attactttat
51541   ctgttatatg tgcaattttt tttgagacac ggtctctggt gcccaggctg gagtgcagtg
51601   gcacaatcat ggtttgctgc agtctcaaac tcttgggctc aagtgatcca cctcagcctc
51661   tggagtagct agccaggact acgggtgcac accaacacac ccagctaatt ttttttaatt
51721   tttgtagaga caaagtcact caactgttgc ccaggctgtt cttgaactct taggctcaag
51781   ccatcctccc acctccacca taacattctt aagagtaaca aaaacactat caccaatatg
51841   attgocaaaa acacttgga cttttttttt ttttgcgtgt atatctgaaa ttgocaaagg
51901   atattcagta tctgaaataa aaaggcaaa ctgaatatgc tgctctctac agcagaggga
51961   gctgctgtgg ctggacagta tctgaaccaa gcagatctta aaactttgta ggtgttgaga
52021   aatgggtggat gcatggactg gcaccgtctg tggagccatg attatgtagg tgagacttgc
52081   tcattatctt gtagtgtttt aaaatgtctt cacatttcta aaggcaactt gcttaatgca
52141   ttttttaatt taaatttttt atgttgtaca gtttatttta aatatagttg ctatttttta
52201   acacagatgc caagtcgggt ctgtgagatt ttctttctgg tgatttggac cagtttgtct
52261   ccctcttgat atatccatcc caaatggaaa ggccctgtaa actgttacga tcatctccag
52321   aggttaactg gaatatacac caatgacagc ttgcctgggt atgcaaaaat acctgcaaga

```


52381 atgtccacat catctggtga tgtcccaaaa taacagtttt taccatagaa agatcggttaa
 52441 catgttttgc ttaaaagtca ttagcagtc taacgtactt acagattctg cctataagga
 52501 ataatacata atttttagata taaaggcccc actagtccag gtttccttat gccactgtgc
 52561 ttcctactaa gtgttgcgac cagctcttgt cactagttag tgacaactta ctccagtagc
 52621 cacagggctg tgacaccata gttataggtg attttcatag atttagccat cccaggttcg
 52681 aaactagtat cctctagctc ttaagtagct gataacctcc ccatgggaga aactccatac
 52741 tgcagtttcc catatggtgc tatgtataac tatcttatac aattaataca aattgcatat
 52801 gtatacttat ataatatgga ctactaggac agaacttttt aaattacaaa taaaatagcc
 52861 aagtagacaa ttacattagc aagtgatgtt acctatgaaa acgtgaggat ttatgggtggc
 52921 aatgcatttc agttaacagg gatgtgttag gggacaatgt gagccaatgt agattaagga
 52981 aataagcctg agaaatttat cagaattagc cgtcagtatt caagcactga tcaacagcaa
 53041 tgtgtcttaa gggcaggcat cactggtgct gagagaactg ggaattgtca actgtgagct
 53101 gctaggggat ggaagaaacc ttagttagt cttaggagcc gcttgcttaa acagatgtat
 53161 cagaaacata ataggccaag ggtcagccct ttgaaaactg acttcagggc cttcctttcc
 53221 tcaggctgct gcctcctagg ccagaccctt attttggctt acattccata acccttgat
 53281 gtgcgatagg gaacctgtat acaatgctga caggaaagg gaagaccatc gccttttgcc
 53341 tttcagtgct tcatctgtaa gcagggccgc Yggctgacca agatcagttc tgaaggcca
 53401 gcctctttaa attccagttc tgtgatcaca aagccactgt tgttcctcat cctgccaaact
 53461 gtgatactgc tgcttcagaa ttactgggtt tcctgttcat catactcacc aacctgaggt
 53521 ttgggtatttc tcaaataattc tgggcttcca gtacatacta gagcctgtga taatcagcta
 53581 atgatcagac aagtttgttg ggagttttac ctaagtattt ttgtgtttta aaaacctagg
 53641 gtgggaaatg ctgagagtga gatgggttga cttcattagg catataaccc atttttatta
 53701 taaaaagaaa tgcacatata agtaaaaaga ccatttttagt tagtcccacc attcgttggt
 53761 aaccagttca ctaagtgtac atctttgcag atttctgtgc atacatacaa atatttttac
 53821 aagaatagga tcataccatg aataccacct ataatgggat gtctgttgtc aatataagggtg
 53881 ttataattaa gactgtgtag ccttcctctg Kggatgtacc aaaatttatt taattccctg
 53941 tcaactggaca cttttgtttc actaataagt agacactgtg taagcaatcY gtcaacatct
 54001 ctgcacctct atttttggtta taagtatttc cttaggataa aatcccagaa atggaattgc
 54061 aaggtataaa agattattaa catttttcaa ggctttaaga tgcctttacg gtgtatctgt
 54121 tacatcctgc ttccacacaa attcttctgt atagccagta cccaagctgc agctctcagc
 54181 acaggtgaag acagccagga tgccccagtc aatgctcttg cccagtctgt cagccttcag
 54241 gtagtttagg agctgaggca tgacctgaga agaggggtgac acacagttag aaagctgctt
 54301 cacagcaggg agcacgagac cttctcagcc aggatgatta tagggatctt ggtctttcaa
 54361 tcctcatact acaaagcagg attatagaca ttatacaatt aacatgttta acaatctaaa
 54421 acttccttat gacttcaaag cccctctcac cttctgtttg gtcttttcca tttgagaaag
 54481 aagttcacaa gtggctgtta atgaattatt ttcattacta atatgccact caaaagggtc
 54541 gaggtctcta tttgggcaac ttttactttg tatcattgca gatgttggtta ctcttgactc
 54601 aagaaacact aattactagt aatgaatata gaaaggacat ctatcaatgt agttatagag
 54661 accagagagg aatcttagaa gtagtctaac tcaaagagtg aataggcaga atagccacct
 54721 gatatggaat cactttatatac aaatcctgtc acctcaattt ggacattgag agctttggca
 54781 ctaagaacca agcagagttt tgtgtatggt cctcataatt ccttttttac ccaaagaaac
 54841 aaaccaatat tagctatgac tttggtaagg ttagtgaatc catagctcaa gagcatttcc
 54901 accctacca aatggatttt gatgctaaca aatccttttg ggcagggaag gacatttatc
 54961 tttaatgctt atatccattt tttctaaca atccacaaac caagattaaa cagtaaagac
 55021 tcctctcata aagtatatag tcaaagactt taattactag aacaagaaag gaaggtatac
 55081 attattttaa ataacaaaag ttaacagagg cactaataat aatgacataa ccacactgga
 55141 ggtggagagc aStgtagata tcctcattgt cacagaagtc agtcaataga ccgtgtctga
 55201 aaactaggaa acagaaaaaa acaagacagt tccttcagg gaactagccc caaggtgagg
 55261 caggaaactg atgattttca ttatagggta cccttcata ctgccatgtt gacccatgtg
 55321 cacaaattac cttggtgaag tttttaatgt ttaaaaacaa tcatgggtgat tacacactaa
 55381 atgggtcctta tttaagggtc tacctggaat tccaatattc tcttggcacc acaggggcaa
 55441 tctggaatat ccttttcttg aggaatatatt tcaccagaaa tccagatggg ggcaatacct
 55501 ctgccatata taagaatcta aaatcaatga agatcatgtt caaataatca ataccttacc
 55561 tataagttgc caatggtaac atgctatcta cttcatgaat gttcctactc ttgatgtagc
 55621 actgacccaa aaggcatgtc acagttcccc catcagacct ggctgtRcca gtgtgccact
 55681 aatgccttct caatcacctc aaagtgatta tttcagttta tctgactcag agggcatcaa
 55741 aatatactct ccagatgatg cttttactac ctaatgttgg caacttaatc ctatgaatat
 55801 attgtgaagg gactaagaat gagcctctgc tctaattgca gaattctgcc cagagtctgt
 55861 gcctaccttc atagttaaaa aatttttagga gggacaaata ccaagtgaat catagtgttt
 55921 tgaaaactac tacaacata agtaaatttc actgtaataa gcttcctaca gcaactgagt
 55981 gggtttctgt attttgtcta aaagcatatg cattgctaaa aactgcctta gtgtttaaga
 56041 cctagatcta ttcttctgt gtatttatatt gaaccagtga ctgggtttatg ggagtttagt
 56101 tttctttctg gatttacgtt tatggtaggg gaggttaagg agaaaaatgt taacatgtca
 56161 cattttacia gccaaagtta cctgttggaa atgggcaaaa ataacctttt ttctttctgg
 56221 cggggggggc aatgggtgcct aaacctcatg taccttaggc aacatctcat tcatctccca
 56281 tccctgatgc ttgctttaga aaatgaacct tgtatgataa acagtataac ctttagtctt
 56341 ttagtaacta ttaaattgat cagcactgca aaacaccttt ctacatggcc catctgtgtg
 56401 aggaactcct ctaacaagat aacaaaagcc tgcttttata ggctcctaag gaacagacta
 56461 atgttactat gaagtatttt cttacagatt atactcataa aacatggcct gaagagaaca
 56521 cgatgaggag ctatgagctc cactttacct gttctgggtc aagggctatc tgagttttaa
 56581 acttctgaaa aattttatct tcctggatt catgttttgc catggaatcc agttcttctt

```

56641 caagtgcctc acctgaaaaa tcaacgtaac tattatgaaa aacaggagta atccccacaa
56701 cttgacaatt cacacatgga gaggggaccc actttttaatc agatagcttt cctattttat
56761 tcactcattc aagttggacc atctgaatth ccaggctactc catccaactc tattatatgg
56821 acttccatth agtgcactc cttaaagctt caaaataaca gaatggtcaa gggcttagga
56881 ctgcccagca catcacagga caccacaaca atgtgagccc ttatcattag tatcctcagc
56941 tggtaggctc actcactcag tcatcaagtg ttcatthctg gcctggagca gtggctcacg
57001 cctgtaatcc cagtactthg ggaggccgag gcgggcgagat cacctgaggt caggagttca
57061 agaccagcct ggccaacatg gtgaaatccc gtatctacta aaaatataaa aattagccag
57121 acgtggtggt aggtgcctgt aatcccagct actcgggagg ctgaggcagg agagtcactt
57181 gaacctggga ggcagaggct gcagtgaacc gagatggtga cattgcactc cagcctgggc
57241 gacagagtga gactccgtct caaaaaaaaaa aatgttcatt tccttctcca cattccttcc
57301 tgggattaca gccaccctaa gccactgctg tccccaacag acccgtgtct ctaagtataa
57361 ccattagtct ttgtaatgta cgttaaaata gaactgatat accttgggtc agagaagcta
57421 aaataactgc tttgatgaaa ctggaaaggc actgatggtg ttcacttgca ccatcaggctc
57481 tgatggagga agtgtaggat gccttcagat tgatgttcca tcaagtatac gtggaaagtt
57541 tcagtataac cgttaggaca ctgtaaatgc tgttccctca ggccctactg cctcctgcca
57601 agtctcaggt aagacacagc tacctccagg aagcatttht ctattcaatt ctcctthtat
57661 tttagaaaat tttggacata cagaaaagtg gaaatactat aatgaaccgc cacatatcat
57721 taatcagtht caacactatc aagtccagtg tttcctthtct ctgccacttc cacctccatt
57781 actctgaagt aaattccaca catatcactt cattcataat taagttatgt acccctcgaa
57841 ggcaaactct ttcctthtat ttaccaatth gaaaatgagt ctgttcccaa gtatcctata
57901 aagatgatta ctgagththt ttaaagtatc atthtgaacc cattaaacat atctgatgca
57961 gttagcgtcc ttgtggatgt tcaactgtc catctthtgc aagcaggagc cthttcatgt
58021 tgcttgagtt ctgacatggc cctagtaatc ctatcctta atctthgata tgaccatgtt
58081 cccacattat atgaacgtht cctgacctag ttctggaatc aaccacctct ccaaagagcc
58141 tggagthtct tttagagaga aatggtacgt agacacaatc aacattatct tcctcctacg
58201 cccaacatct cagthtctcag taacaccaac ataattactc gthtcttht ccccaatac
58261 acacacaacc atctcaaaat aaaagcaaca gtctagtaat aacatgthta ttcaaaatac
58321 taacactgtt acattcttht cattctcagg gcattthcta ctagagatgt actgtcctat
58381 gthttgaagt cacctggaag agthtcttagt gtggttatat gactacatca agagththt
58441 actthtgatg attagggact gctthttaa acttactthta ctccataatc ttaaaatact
58501 catacagthc cacagtcaca tttacactaa caaggcatat ttgaagtcca gctthcatcc
58561 ttgatcctgc tactctaggc tctcctthtct cctaaagata agcattthtca ttatgtatca
58621 tgtthtatct ataggcatga acacacgcgc ggccctthtcc aggcagtctt cagtgatgtc
58681 acgtgtthccc atggcacctg tattgtactc ttatcagtha ttatatggac tthaacttcc
58741 ccagatatta tttgggctcc tccataagac tgtgagcatc tgaccactgg agtgttgctt
58801 ccattatat cctgtttatc aagcacagg tcaggcacag agtaagactc aaaacatgtt
58861 ttggaatgta tgactggtat gaactacaaa ccagtaagct gatgtthtca ttttgagtct
58921 ataaatctaa tthtgtggtg gthttgtgta tKgtcgaagg ctcaaattgt aaaatttaat
58981 attatgtgac caaagaaagt tatacccgaga acctcaatth cctcaccttc aaaatggggc
59041 agthtctcac tcattggtct gctgtcacga thttaatgag ctcatgcaca aacagccctt
59101 tatataaggt aagtgtcggg taaatgttgg ctactataat aaaataagcc tctaagatac
59161 ttggtcagca caagtactac ccaagagtat gcactgtaag taaactgaca aaatttgtgta
59221 tctaaaactg gccagatgaa agagaaactt ttaaggggccc cttctgcgtg cccgacactg
59281 tgctaggcac tcacactatc ccgacccgag aaacMgatct gcgaccagga ggaacttacc
59341 aagcctccag catcttgtgc agccctactc atgggacctt ctggataccc acccttgtct
59401 ttacaggggag cagaacacac ctcttatgtg tcagaaaaca aagtccagga agtatattht
59461 tacctgaggc aatatctgaa aattgtatgc tacagcctcc aaagtgagtc ttcctctcag
59521 tacctctctt ctaggcacat ggagccctth ctthcaagta ttatgtthta ccacttaatg
59581 aatgaagtcc tgaaactgct taccatgct ccctataatc tctgagtaat cthcctthtcc
59641 cacaacctca ggcataatct catcttctgt ttctattaca atthcaaatt ctggaaaaag
59701 gaagttgtgg tctggaatta tatggtccag atgatctgaa acaaaaagga cagcactatt
59761 agtaatcatt tagthttgaa gacagtctaa taatttgctg tctctaaagt actatattcc
59821 ctatagthtct ggcatthtag ataaagggtc ataaattaaa tgcctatatg gtgacattat
59881 tcagtgatth agacttcaca gcctththt thththtaca aaggtgttcc aggcatagaa
59941 aaththtaag tactatacct thcctaatht tacctthtaa gttgtcctgg aaatatctgg
60001 gttgacaaag gcatgaaac tgaactgaRa cttaaaaaaa agattaccca cctgggtgtg
60061 cacaagcctg cttatgtccc aatctccagt ctagggtctg atgctccttg ctgcagtaat
60121 atgctthtgat gcatctggag cacgtthtgg ggcctaaaca gccacaaacc ctgcagagat
60181 gagcaccaga cttaagctgg agacacactg attctcctgt thctggggga ggattctcag
60241 aaggtggctc atatgagtaa aaatcgtht thctgggtag ttgattccta aaaactaaaa
60301 aagaatacag agaaaagtht tatctthcaa caaacacaga attcacatat thtatcctct
60361 gcacgtaaaa ctgaaaataa caacaacaaa aaagaaatga aagththtgc thtcaggaat
60421 aagctthttaa aatccagaaa ctagatthtgc tccggtacac gcaactgagt tgcctcctag
60481 aggtggtht agttaatcaa attaaataga ctgatcgtht agaacgactg ccaaaaatac
60541 gaaaaagcta ctgggatcca tctthccaag acaathtcta thtatctgaat taacaccata
60601 cctggtaccc actgattaaa agctgggggt taccaatgcg cgtgggcaca gttagaagct
60661 tatgtagcaa aaatgagcac atcctggaag ggcccgggag aaggtgctcc tggggcagcg
60721 cggagaggga gctctgaggc tggggcggca gcggtgcttg ccgctgctcc cctggtcgtc
60781 cccggaatta acgcccgcga cgcgtcggag gcatggcccc gtcccagacc cgtthtggcg
60841 ctcacctcgc aggcgggcac agcacggctg ctgcggcgag cagaagagga agatgcagcg

```


60901	gtggaaggcg	tccgggaggc	caggcagcgg	cgcatacacc	tgcagcagga	aggagagcgg
60961	gcggccgcac	agctcgcagg	ccagggcctg	gggccccggc	agcccggccg	cgcccagcca
61021	tgccggccgc	ccgcccacct	tgctggggaa	ctgctcgctg	cgagtcgccc	acgcccggcg
61081	cgactcggcg	aagcccagct	ccacaggcct	ggccccggcg	gcagccatgc	ggggcgcggg
61141	ctggcgctggg	gcgcagccca	cagctgggtc	ggaaggcgga	aatcggggcg	cgggccggaa
61201	ggcaagaggc	gggcaccttt	ccggaggaca	ggaggcgga	acgcgtctga	cgggagcggg
61261	tgcaggacca	atgcgagggg	acggggcaga	ggaaacctct	cggcacatgc	ccgccccctg
61321	gcgcctctgc	ctccgagccg	ctttcctggg	gcctccgggt	gctctgggat	ggttctgggt
61381	tttgggagag	tgccagctgg	tgacggcgct	ccgctcacct	ctgcacatgt	cttgctgtgg
61441	gcctgcgggt	ggccgcccag	gaggcagagc	cctcccKcaa	accttccctg	ctgggtgtcca
61501	cctcagggtg	tggaacacct	gtgcgctggc	cgagtgcata	ccaagagtag	gcagtgaag
61561	acaaatgaag	gttgaacagg	taaagtgagg	accctacagc	ggaaaccaag	aatcctgtgt
61621	gcctgagagt	aatgaagaag	cctctgcaga	agagtctttt	ctgtcagtct	taaggtctct
61681	gttttaaatgt	tagtgctggc	ttgctgtacc	tgaattccaa	gggaggagtg	tataatgagg
61741	catggccaac	ccccacttcc	catcattgcc	tgaactagtt	tttcagggtta	acttcagaat
61801	gcccttgggc	aagcagaggg	tccatcagtc	ggttggaggg	tttagaattt	tactgttggt
61861	ttgcaaaggt	ctgaaagaaa	catgtaccac	ctgttctctt	taaggagttc	tacttaggag
61921	gtttcattta	cataacaaga	ccgtgggtgt	cagccagggt	tccacccgca	taacctgtta
61981	tgccacaatc	caaaccccc	ttctgtaacc	tcaagatggg	atataagttt	ctgaaccccc
62041	tttggggcct	cagcaaaatc	actctgggtc	tcccccatgt	gcagtgtaat	aaatttgtat
62101	gccctttctc	caattaatgt	gccttttgtc	agttgacttt	tcagtgaacc	ttcagaggac
62161	aaaaaggaag	ctttcccttg	gctactacag	tggttttaat	ggaagtaaag	tcatacaaaa
62221	catttatatt	tgacaaaatc	acagtttagt	tgccaggtata	tttggtttgt	tttggttttat
62281	ttgagatgga	gtctcgctct	gtcgcccagg	ctggagagca	atgggtgcgat	ctcggtcac
62341	tgcaacctcc	gcctcccag	ttcaagcatt	ctcctgcctc	agcctcccga	gcagctgggt
62401	agcagtatat	ttgtaatggg	acataaaaata	atgtctgttt	ttaaataaac	atttacattg
62461	taaaccaaaa	gttaactctc	catcaatttt	tttttttctt	ttttgagatg	gcactcttgc
62521	ctgtcaccca	ggctggagga	gtgcagtggc	atgatctcgg	ctcactgcaa	ccttcgcctc
62581	ccaggcaagc	gatcctcttg	cctcagcctc	ctgagcagct	ggaattatag	gtgtgtgcca
62641	atacaaccag	ctaattttcg	tatctttggg	agagacagag	tttcaccatg	ttggccaggc
62701	ttgtctcgaa	ttcctgacct	cagttgatct	gtccgtctca	gcttcccaaa	gtgctgggat
62761	tacaggcatg	agccaccaca	tccggcatcc	atcaatttag	aaagtattat	tcaccaagat
62821	taaggttgca	cccgtagcac	agcctcagaa	ggcctgatg	accatgtgcc	cttggtgggc
62881	agggtacagc	ttgcttttat	acatgttagg	gagacatgag	acatcaatca	gtatgtgtaa
62941	gatgtacttt	agtcaggtaa	agcgggactt	gaggtgaggg	cctccagRtc	atgagtagat
63001	aagaggcaaa	agatcgcat	tttttgagtc	cttgatcagc	cctccactga	atacacaatt
63061	tagtctggct	cagtgaatta	tcattttttaa	gtaaacaata	ggggaggggg	agcaattaga
63121	tatgcatttg	tctcaggcgc	accttaaagg	gataactttg	agttctgtct	gtcctttatc
63181	cacaaggaat	ttccttggg	gcaaatttta	agggaggtag	gtagcctctt	atcctggcag
63241	ctatcttatt	taggaataga	atgggaggca	ggtttgccctg	acatagtttc	cagcttgact
63301	ttaccctttg	gttttagtgat	tttggtgtcc	tgagttttat	tttcctttca	cagaaattat
63361	accgtaaaag	taattgaaga	aatcacttcc	tttcccttcc	cctcaactag	gccttgacca
63421	ttttaataaa	aatcaggatt	tgctgaagg	caacaaattt	aaccaagtcc	agttaaaact
63481	taactctgaa	tctgtatgtc	cctgggggtc	tttccagtg	gagatgtcta	agcatcatcc
63541	caagcttttc	tataactaact	ggcctatttg	tatgtttctt	attttaggat	tccttttggt
63601	catgtgtatt	tttattaggc	aatcacccat	ttcctgtagg	tttccagggt	aatatatatt
63661	tcttattgga	attttaattt	atcctctcta	gttttctaca	tatttttttt	ttccttgaga
63721	cgaggctctc	tatgttgccc	cgggtggcct	caaactcctg	ggcttaagca	atcctccac
63781	cctggcctcc	caaagtgtcg	ggattatagg	tgtgaattac	tgtaccacgc	ctagaatcct
63841	tagtcctata	tacttttgct	gtttttttca	ttgccaactt	gaaataataa	aaagggtcag
63901	aatcctataa	acaaaaata	aaataaggcc	ccccaacctc	ctgaatggac	ttcctcctct
63961	gacacagatc	ttttacaatt	taacctgtat	gaacccccaa	aattggagac	aggctctcag
64021	Kaatttagaa	aatttatctt	gcgaaggtag	aggacacacg	attatgacag	cctcaggagg
64081	tcctgacgac	atgtacctaa	gatagtcaga	gcacagggtg	gttttatata	ttttaggagg
64141	atataagaca	tcaatcaaca	tatgtaaaat	gaatattggg	caggaaagg	gggacaactc
64201	aaagaaaaaa	tggaacaact	cgaagtgggg	aggggcttcc	aggtcacagg	taggtgagag
64261	acaaatgggt	gcactctttt	gagtttctga	ttcacctttc	taaaagaggc	agtcagacat
64321	gcatttatct	cagttagcag	agggatgact	gaatggaatg	ggaagcagg	ttgccctaag
64381	cagttcccag	cttgactttt	cccattagct	tagtgattat	gggattccaa	ggtaatttcc
64441	tttcacattt	ccccctttt	ctttttttaa	atattttgga	gaaagcattt	ttgaagaaaa
64501	taagtttctg	ttcccagggt	ttatctgctc	tctcatggct	aggatgggtt	tttcctagaa
64561	gggtagggtc	tgagttatta	ggaaagctca	tttttagaag	gttgtgaagt	ctaataatcct
64621	atcaagagaa	aatttgggga	ggaagggaga	acaataagaa	caatcttgga	aaattgatct
64681	aggccacatt	actctgaagt	ccatacatca	gtaagcagg	atgaaagtgg	cttatgtatg
64741	taaatagggt	cccattattt	tcttctgaag	tttaagttgt	ctacttcagt	tcacagggtc
64801	tcacgaaagt	tagtttttaag	tgacttaggt	tagtgacagc	ttagttttaa	gtgactccaa
64861	attaggaaaa	atggggaaaa	aaagaaggaa	aaaaattgaa	aacattattt	tgaagacttg
64921	tagcccacaa	aaattagaat	ttgggtccaa	ctgtagaaaa	tgataaaaa	tgaaaaacat
64981	taggcaagac	tagaatctaa	caactgggtg	actatagttt	tccagtctct	agtttcccat
65041	ttataactaaa	gacaaatcat	gatagggttg	ccttattata	tttggccgaa	ttatttgtat
65101	acagtgcagc	aagaataatt	attttttaac	attggccttt	aaattggcct	tgatgggaact

65161	ttgttccata	gaggggtat	ttttttaa	ctgagccc	ccatggatt
65221	gtgccatcaa	atacctgtg	gtttggat	cctctcct	tgaggttcca
65281	gaggctcctg	ggcctgtcag	aaagtgcac	tctttact	ccacaggtca
65341	acaggagctg	tgtagacaaa	gttatgagga	cgggttttcc	aaggggggtt
65401	gtaagtcaag	taaaagcatt	ggtaaacaac	cagtttcccc	aatttgtgtcc
65461	gaaaacagat	tattagtgc	cttatgcaaa	taactgtatt	gtcataagtt
65521	acagttttcca	aattctggag	aaatcgggta	gagagaacca	aatgtgctcc
65581	cataggagta	tgtgttactc	aattgttaaa	agctgcagat	agcctgacca
65641	accctgtctc	tactaaaaat	acaaaaaata	gccaggcatg	gtggYgcgca
65701	cagctacttg	ggaggctgag	gcaggagaat	cacttgaact	tgggaggtgg
65761	gagccgagat	cgcaccgctg	cactccagcc	tgggcaacag	agcaagactc
65821	aaaaattatc	ttgtttttat	caatctttct	taaatgtata	gctcacattt
65881	ttaaaatgag	aaatatattg	ggcttttatt	tagacgtttg	ttgatgtttt
65941	aatatgttac	aagaacttaa	ctcttggtta	tatcaatcat	cccatggcaa
66001	ttaccagtag	tgttgcttaa	agtcacagtt	tccaagaatc	tatccatgat
66061	ttactggact	taatagtact	gaattgtaca	cataaaaaat	gttaagatga
66121	gttatgtgta	ttttaccaca	attttttaaa	atgaaaaaaa	gaaatcctgg
66181	gttcaaagaa	ggctttgaaa	agctctgata	tattccagaa	atctagacag
66241	gcagggtctt	gtgcgtggcc	atgaaagacc	tgaggcagct	gtaatgtttt
66301	ctgggggttct	gtgccatcag	aaagtgaagg	ctaaagcaga	cttggaactgc
66361	aagatgtgtc	ccagcacata	caaagccact	ctacaaaggc	tgggagacat
66421	catttaagga	aatctctatc	taatcattag	ctgaccactc	agcacactaa
66481	aaagacacat	gacaaagaat	acagacttca	tagaattagt	cagggaaagt
66541	ttcaacagca	acaacaacaa	aacccttgag	aggggaaggt	ctggcttaca
66601	cctagtcttt	aaaatattca	gttttgagca	aaaatatgag	atacaciaag
66661	ccatgcagag	gaaattctga	gaccagctcg	atcgggggaga	ccctaaccce
66721	gggatattaa	agacacacac	acacaaatat	agaggtgtga	agtgggaaat
66781	acagccttca	gtgctgagag	ctccaaacag	agatttaccc	acataattat
66841	ccagtcattg	gtattgtttc	tatagatatt	aagttaacta	aaagtatccc
66901	cgaagggatg	tgccgaatta	aaggaatagg	ttgggctagt	taactgcaac
66961	ccttaaggca	cagatcgctc	atgctattgt	ttgtggctta	agaatgcctt
67021	tccgccctgg	gcggaccagg	tgttccttgc	cctcattccg	gtaaaccceag
67081	cctgggtgtt	atggccatca	ggaacatgtc	acagtgtctg	agagattttg
67141	gttttggggc	cagtttatgg	ccagattttg	gggggcttgt	tcccaacagg
67201	agtcaatgga	aattctccat	gaggaggccc	agatgttatc	cttcctaggc
67261	aattagctat	tataaatatg	ttcagagaac	taaaggaaac	cattttctaaa
67321	atgtataaga	atatctcacc	aaatagagaa	tactaatgaa	gagataagaa
67381	caagtaagaa	atgctagagt	tgaaaattac	aaaactgaaa	tacaaaattc
67441	ctcaacagca	gattagagat	tgcaaaaagaa	agaaacagca	aacttgatga
67501	gagattaccc	aatcagagga	gcagaaaagaa	aaaagaataa	agagaaatga
67561	agaaatctgt	gggataccat	caaacaaatc	tggaagtccc	agaggagaga
67621	aaaaaggcag	aaaggctatt	tggagaaata	atagccaaaa	ttttccatta
67681	ttgattaaaa	tttatatatt	ttaaaaagtt	taagtgtatc	ctactcatac
67741	ggtccatacc	tagacacatc	atagtcaaac	tgccaaaaaa	gagagagaga
67801	caccaagaga	aaaacaattc	atcttgtata	agagatcatc	agtaagatta
67861	tcttgtaaaa	aactcacaga	gaacaaaatg	ctgcagaatg	acatacttgg
67921	gggtggagaa	gcatgccaac	taagaattgt	atatccagct	aaactagcct
67981	aagaagaaaa	ataaaaaaaa	aatgagatat	tcccaaatta	ataataaaca
68041	agataatctg	tcattcatag	atctgcctta	tgagaaatac	taaagggcct
68101	gctgaaataa	aagaacatta	cacataactt	gaatctacag	aagaaaaaag
68161	aaagtaacta	cataggtata	taaaaatgat	agtataaatg	tatttttgtt
68221	tcattctctc	tgatttaaa	gacaactgca	ggaaacaata	ccaataaaaa
68281	atgttatatg	aaaatttaat	ttgcatgatg	gtaataccac	aaataagagg
68341	gagctatat	ggagtaaagt	ttttgtgtat	gatttgaatt	aagttggtat
68401	tagattgttt	taaattaaga	tgataactga	aattaaatgt	taattgaaag
68461	agaaaataga	gtaaaagaaa	caaataaata	aatggcact	taaaaatatc
68521	gaaagcaata	atggagagca	aatgacttg	aaacatacag	aaaataaaga
68581	aggcacaat	cctaccatat	cagtaattaa	atgtaaatga	attaaacatt
68641	aggcagagat	tggcaaaaat	gattaaaaca	caaaacacag	acagaaacag
68701	ccaattatat	gaggagacct	gctttacatt	caggaaaaca	aataggttga
68761	atggaaataa	atatactctg	caaacagtac	ccaaagacag	ctgaagtggc
68821	ccagacaaaa	tagactttta	tgcacgaatt	attagagaca	aagacatttt
68881	ggtcaatgta	tcaggaagac	ataacaatta	taaacatata	tacctctgac
68941	caaagtaaat	gaaacaaaaa	ctaacttaaa	aagagaaata	cacaggtcaa
69001	tggagacttt	aatatcccac	tttcaataat	gaacagatct	aggcagaaga
69061	atagaagact	taacactatg	aaccaaata	acctagcaga	catctgtata
69121	caacaactgc	acaatatata	ttcttcaaat	acacatgaaa	gattctctag
69181	gtgttaggcc	ctaaaacaag	tctcaataag	tttaaaagga	ctgaagtcac
69241	tcttccaacc	acaataaaat	gaaattagaa	atccataaaa	gaagaaaatg
69301	acaaataagt	agtaatgaaa	caaaataacc	tatgggataa	aaaggaaatc
69361	ttagaaaata	tgtagagatt	aatgaaaata	caccatgtca	aaattttatg

```

69421 agtggtgaaa aggaaattta cagctgtaaa cacctatatt taaaaagaaa gatttttagtt
69481 caataatcta aacttctacc attagaaatg aaaaaggaaa tgcaaacaat ctaaatcaag
69541 cagaaagtag aaaatagcag agattagggg ggaaataaat ggaagacca aaaaacagag
69601 aaagtaataa aatcaaaagt tgggtattgc cgaaaccagc ttggctgggg agaccctaac
69661 ccagtggcac tagaggaatt aaagacactc acacagaatt atagaggtgt ggagtgagaa
69721 atcaggggtc tcacagcctt cagagctgaa agcctcaaac agatttacc acatatttat
69781 tgacagcaag ccagtgataa gcagtgtgtc tatagattat agattaacta aaagtattcc
69841 ttatgggaaa caaagggatg ggccgaaata aagggatggg tctggctagt tatctgcagc
69901 aggagcatgt ccttaaggga cagatcgctc atgctatttt ttgtggttta agaacacctt
69961 taagtgggtt tccgccctgg gtggtacagg tgttccttgc cctcattccg ataaaccac
70021 aatcttccag catgggtgtc atgaccatca caaacatgtc acagtgtctc agagattttg
70081 tttatggcca gttttgcggc caatttatgg ccagattttg ggggcctagt cccaacgtgt
70141 ccccttctt tgatttgcaa agtgataaaa gcaaaggcag ttttgtcacg gtgagctact
70201 tcttgaggga gtcaggatcY gcattctgcag actatacaaa aacaacatag attaaaagca
70261 caatcatcat cgaaatcaca gagcttccaa gtgttttcat ccattttaat ggggtgctag
70321 ctKcttatct gtctgcagct cctttaagca ctcttttcc ttggcattaag gtcaggtgtg
70381 cctaggatgc tttatttgtt cttttaattt tgcaatatcc aaaaacaagc ttgtagagtg
70441 tccttctaga tgctttttta attccttccc aaattttgat ctaattaaga gctattaata
70501 atttccacaa atccttattt aagctcctag agtggggccat atcatttgag gttgaggtgc
70561 cactataccg ccatgggtcc agatgatagg aactcttgcc atgtcttctc atttctacca
70621 tctgaccatt ttgttcagac cagctgaaca tagtgtggct gtggcatgca gactgagagg
70681 tgcaattcaa gccaaacatc cccttagggg accaatcaat aatgattcca taggaagcat
70741 tgtgcagcac ctctgcctgt tctgcaatgc agtcttccca aacaagtaca ttcatttttt
70801 ctaactgggt ccaatcctgt ttacaaatag gtttttgagg gcagtatgcc ttaattatag
70861 gagcagattt attatggtaa atactgagat cagaaagcat gtgtaagtgt gtcataagag
70921 gattacatcc aggcattatt gccagccaag attgataaMt atgccaata agtacagttg
70981 ttctctgtgt cagcacttgt tgaaggaaata ctcatggcaa tggatgcac cgctgtcata
71041 gctaccatta aattactcac tgtgactggg tgcctgctt tctcagggtt ttctcttgc
71101 aactgtgaca gcttcttgat ctgtcccca gtgggtgggt gtgtttgatg ggtgttgctc
71161 gtgacagttg gggctcctcc cagcatcagt cttgagatgg ctgcaaccag ggggtcctca
71221 ggatcctcct ggaatctctt cctcagcatc tggctcatga taaggtttca ggtatcttga
71281 tggtatccaa atcagctctt gattttggcc tggagaaaca caagcataac ctctaccca
71341 agttattatt ttacctattt cccaaccttt tgttatgcaa agtgagaaaa ggtgtgcaca
71401 catacatgta acgtgtgaca tccatttgcc aaagataatt aggttccaat cctcgaggat
71461 taactcctcc tgcaaaagat gaggaatgca ccatttgga agttgggcat cactggatca
71521 taacttttagc ttctttccag gtaatgctgt atctgtgttt cagaccagag gcattaacat
71581 gggttaaatt gtgaaaatgt ctagcagtag atattgcttt agcaactagg tgatcagcca
71641 tttgattccc ttcagtcaaa ggtcctggaa gaggtgtatg agccctaatt tgagtgatgt
71701 aaaaagggtg cattctactc ctaactgctg tttgcaactg ggtaaataaa gtcattagt
71761 tcatctgttt gaaattgtaa ctgagcattt tcaactaact gtgtggaatg aaccacgtat
71821 gaagaatcag aaatcatatt aatagacata ttaaaagcag tcaatacctc aattacagct
71881 acaagctctg ctgttagagc tgaagtatag ggtgtctgga aaactttaac ttttgagcca
71941 gaataagaag ctttaccatt actagacca tctgtgaaac aatgaaaatg cttagcaggc
72001 tgcaagtgtt ttactgcagg aattataaat gtgacaatta aaggccaatt ttttggaatt
72061 gtgatagtaa agaaacagtc ctttaaattc gtgacaatta aaggccaatt ttttggaatt
72121 atagcaggag aaggcaatcc aggaggctgt aatgctccca taggttgtat aactgaattg
72181 atagctatta agtcagttaa cattctccat ttaccgatt ttttcttaat tatgaaaact
72241 ggagaattcc aaggggaaaa tgctggcgct atgtgcccac tttctaattg ttcagtaact
72301 aattcctcta aagcctccag tttctcttta cttagcggcc attgttctat ccaaattggc
72361 ttatctgtta agcattttta aggtgtaggt tctggaggct taacagtggc cgccatcaaa
72421 aatgatatcc tacaccttgg cgggaacttt gtctttacgc ttgaagcggc tccttcaaac
72481 cttgcaattt ttttcctagt cccataccag ggacatgccc catttcatgc atcatatgtt
72541 gactttgagg gctatataat tgttctggaa ttagaacttg tgctcccat tgttgtaata
72601 aatctcttcc ccataaattt gtaggtacag aagttataat tgggtgaata gtcccagggt
72661 gtccatcggg ccttcacaat gcaaaatata actactttga tatacttcag gggctttacc
72721 aactccaact atgttaaatt gagcgggtgg aattggccac gcaaacagcc agtgctgtag
72781 agaaatgatt gaaatgtctg ctctgtatc taccaaacct ttaaatttct tccctgaat
72841 agttatttca caggtaagat gtttatcagt aatttgattt acccaataag cttctttgcc
72901 ttgtttattt gtgctttcaa atcctcctgt tcgtttaatt taacttttcc gtatttctac
72961 atacggcaca atcaggagct gtgctataag ctctcctggc tctgctttcc agggaaacaga
73021 agtggatata acaatttgaa tttccacatt gtaatctgaa tcagtactc ctgtttgtac
73081 ttgtatccct tttaaattta aactagacct tactagaagt aatcctatca tccctgctgg
73141 caatgggtcca cagactcctg ttgggaactt ttgtgggggt tcccaggcca gaaggctcac
73201 agcatttgtg cagcataaat ctactgcagc agtaccagct gtggcagggg acaaacattg
73261 taaatcccat gaagtatatg gggatttagt gcattcattt agagctgagg gctcttaggt
73321 ggaagatgtt aataaactgt ccaggctcca tgggtcagca gagcatttcc cattgctggg
73381 gcccttaggg atctccagga tttatcccag agtgcccata atggacagta caaaaStggg
73441 aagagtttcc aagaaagcaa ataccccatc atccaccaca aaacacactc tcagcttatt
73501 catcaatgtg gcactgggggt ccttaatgtg tggcaggcag aggtaatgac agtgagcaaa
73561 tagccagggg attacttgag ctaaaagcaa caaaggaacc aaacgcttcg actttctgac
73621 caaactcagt tcccaactga agctggctct atgcaagtgt gctggcctga gtgatctcac

```



```

73681 atcctgtgaa ggctctgcca aggaggggatg gtggctaggg tcaggcctcc ttaagagggg
73741 tcccgatcc taccagaggc taagggtggga ggatcgcttg agcccagaag tttcagagca
73801 gcctggacaa catggagaga ccctgtctct gcagaaaaaa aattagcaga gcatggtggc
73861 aggagtgttt aatgccagct actcaagaag cagaagtggg aggattgcct gagcacagaa
73921 gtaccaacct gcagttagct atgattgtac cctgacactc cagcctgggc aagagagtga
73981 gaacctgtct caaataaaga aaggaagaaa ggaagaaagg aaggaagaaa ggaagaaagg
74041 aaagaaggaa ggaaggaaaa ggaaaaggaa agggaagaaa aaggaaggga agcaaaggga
74101 ggaaggaaagg aaggaaggag aaagaaagac aaacagagaa aagaaagaaa agaaagaggt
74161 gctttggaga aaccacacaga agacttttac acttttagttg tgttttgaat acttaaatecc
74221 aacatacaaa ggaatagaaa ttatatctct cacaattatg atttttcttt tctttctccc
74281 tttttttttt tttttgagac agagtcttgc ttcttcgccc aaactggagt gcattggtgc
74341 gaccttggct cactgcaact tctgcctcct ggtttcaagt aattctccta cctcagcttc
74401 cccagtagct gggattaaag gcatgtgcca ccacaccggg caaatttttg tatttttagt
74461 acagacaggg tttcttcatg ttggtcaggg tggctctcga ctcccaacct caggtgatcc
74521 gcctgcctcg gcctcccaaa gtgctgggat ttaaaggcat gagccaccgt gcccgccag
74581 gtctcagatt ttttagaaag tttattttgc caagttggag gatgcgtgcc tgtgatgcat
74641 cctcaggagg tcctgacaac atgtgcccac ggtggttggg gcacagcttg gttttatata
74701 ttctagggtg acatgagaca tcaatcaata tgtgaaagat gtacgttggg tcagtccaga
74761 aagggtgagac aacttgaaga gaaggccaaa caggggggct ccaggtcata ggtagaaaag
74821 agaccaatgg tttcattctt ttgagctgct gattaccctc tccaaatgag gcaatcagat
74881 atgcatttat gagcagacag gtggctttgg atagaatggg aggcaggttt gccctcagca
74941 gttcccagct tgacttttcc cttagctta gtgattttgg gtcccaaga ttgatttttc
75001 ttttgtaagg tctaacatgg tttcctatga gcattaatta ttcatttgtt attttattac
75061 aaaaataagg cacagatttt ttaaaaaaca tcaatttcat gactagttaa atacacataa
75121 ttacactgaa gttcaactaa atttggaaac attccagagt ttgggtttct aataattctt
75181 tgtgattctt tagaagctaa aatattttaa caaagcaaca tctaaaatca cctgtagaat
75241 gtcctgccat ttttgtttct ctagtttctt cattttctgc aaagcctcgc tgaggaaatt
75301 gactctgaat atccttttac actcttctgt tttagaaagc attgtggtga aacattgaat
75361 cataatggct acaagtcttg ttcacattct ttctttcttt gaatattttt tcccagtggc
75421 caatatattga ttctgttgta ttatgggtaa aaggtaggca tgagaacaaa ataaagacaa
75481 gaggtctttt gaataagtga tccagtcaca atgaatcaat ttgccattgg aacatatttt
75541 tacgtcactc ttctgaaaat atttagccat gaattgaaag agagtctgta agattatttt
75601 tttcctgttc taagggtgaa agcatttttag agaatgaacc acaaccacag cacaagaaaa
75661 aaatctgata aataagttta cacatatgtg ttactactgt aacataaaac atgtaaagag
75721 catttgtttt gatttatata tcagtcgtga ttgtttaatt ttttggtgca taaatgctct
75781 tatttaaaag acaggactat ttaacagtgt aaattactag taattcatgg tataaataat
75841 taaacaagga agtgttcaaa aatataacaa tgttttaaat aagcccatth tgtgcttctg
75901 taacagaata cctgaggctg ggtaatttat aagtaaaaaa cgttcatttg gttcacaata
75961 ctggtggttg gaatgtctga gattgggcag aggcattctg tggggcctca gtctttttca
76021 cctcatgggt gaaagtggaa ggggagcaag ggagtgcacc agagatcaca tagcaagagc
76081 aaaagcaaca gtgaagccaa ggaagtcaga ctctttttta ctacctactc ttgcaggaat
76141 taatccattc ctgtgagagc agaactcact cactctgtg gaggacaata atctattcat
76201 gaaggatcca tcccagacc caaacacctt ccactaggcc ccacotcccc acactgccac
76261 attgggggtc aaatttcaac atgagatttt gcagggacaa accacatcga aaccttagta
76321 atttgtagca tagttaaatt ctttttcaca tgatgtattc tgtgctggga tactccacat
76381 cctgaatatt ttaatttaat ttgaatagag tttgatttac ccattttgct gtaaaattcc
76441 gtgtgttttg acaaattgat agttgcaggt atccattatt aaagaatcat atggaatgct
76501 tcaaattccc accccatgca gccaatggca ttcccatctg tgcagtttgc cttctccaga
76561 atctcattaa atgaggtcac actgtgtgtg ttctcctcag actgtcttct tccactcagt
76621 aatgtgcatg caagattcac tcatgtcttt gtgtgagttg atagcttggt cctttctatg
76681 gctaaatagt attccattgc atgaatgtac cacaatttgg ttatgcattt tagggagcaa
76741 aaccttcctc ttctaacttt gttccagggt tggagacctt caaattaact gacaatagat
76801 acattagtag gagaggcaat acttggcttc ttattccaca agtatcattg tgggacaaaa
76861 ttcacatgat ggcaggatct agtttacaaa gaggtgaaaa tagcccaaaa cgagaaacaa
76921 gactagaatc tgataaccca caagggtat agttttcctt tttaaaaaaa tttttttttg
76981 agacagagtc tggctctgtc gccaggctg gagtgcaatg gtgcaatccc agctcactgc
77041 aacctctacc tcctgggtgg aagcgaacct cctcctcag cctcctgatt agctgggact
77101 acaggcacat gccatcatgc ccagctaatt tttgcagttt tagtagaggt ggggttttga
77161 actcctggcc tccaaaagtg ctggaattat aggcttatgc caccatgcac ggctgagtta
77221 tagttttcca ttgaaacata aaatttctct ctgtagtaac catcattttt gatcatagat
77281 aatcaatgtg agattattct tgttttaaaa ataagtctag tttcgttaga ttttgctga
77341 gtatttatgt aagtgcagca agaacaggag gtgaccacgt aggtgctttc aagcttcttc
77401 gctggaagtt ttcatacaga atctcagatt ggacttttaa aggccttatt gaggctaaaa
77461 gccaaagcaa gaacatactt tcaaatttca gctgcagtc aatttcctgg gcctagcagg aaattacctt
77521 ctctcttctt gacgccccca aaatatcccc taatgtaggt accaggctgg cttttctcaa
77581 ctttactaac ctgtaaggct gtgaaccgtg tcagccttag ttccttaaaa ttgctggtca
77641 agtgctttgt aagcattggc ttcataaaaag atgatatcc agtaaaagcc tgataatata
77701 taactgatct caggtatact attcctaaat ggtgaacaga tgcttattgg acttctgcta
77761 atcaaagttt ccaattatgt cttgctataa tcaagagtat tttcaaaatt ctggagaaat
77821 acaactatat tgtcatgaaa ataagagtat cagtaagat tttcaaaatt ctttcaaaaa
77881 caggcaggga aaaaaagatt tttttttttt cccacccag cctcatttct gtttcaaaaa

```



```

77941 gtataatcta ctaaattttt gtgagttata gttagcttaa gagaaagaga tttctttaat
78001 ccagaaacta gaacattaata gaaccagcag tactccaaaa aagctataaa attataatca
78061 attttcatca cttcattcag tgccatgtaa tcaattccag tcttgctgga tcttgggtta
78121 gcagtgtcac gaacccatcg atttctcaac cagacttctg gagatcttca ctgagtcaag
78181 tgtatggtct taaagttatt taagcaatat catcagaagc ctacaaccag agtacctgtc
78241 ataggctttt tcgtgagtct cagagcgagt cctgtgttgg agacaaacat tctgacctgt
78301 agctgattgc aggagctttc aggaaagtat caggggggaaa tagtatctaa atgccaaaga
78361 gtatgaaatg gctgtgatga aaggctcagat gagagtctcat tataccacaa ctgacaagga
78421 tattcgattht ttttgggtggc atacaacgtht taaaataata attgaaatta tgactcaaaa
78481 cagtataaccg gcacatagca tggataagga ggacattgac aaatttccag taattttata
78541 caatttctga aaacataaca ttttatccat acaaatataa cccagggaag gttaggatct
78601 tcttttttatt ttatatthtgg tatggthtttt cttataaaaa atacatccta ctttacctgc
78661 aaaacatgcc ctgctthtttg catactthttc atagagthtg ttctagthtt taatacttag
78721 taatctctat tttccagaga aactaggaag aagacaattt taaactgtca tacattagca
78781 ttctatagta gattagaaaa tgtatgagta taccatctcc caacatctag agggatgtgt
78841 ttctctattg tacaatttct cagtgtggta gacaaaaata cgtttattaa cgggccaaaa
78901 tatctthtact ctctctgtaa aaacaagaag ccaaaagtat ataaacttga attacttatg
78961 ttcagtaatt aatgthtttag tatcgtatct tathttaaaat gatctagata ttgaatgcaa
79021 atctthtact tagcttaact ttaaggthta aaattaccaa aagthattttg gaaactatta
79081 ttaggcagat ttactgtaaa aaattattat tgaaataatg cthttataaa gaatgacaat
79141 tagaatcaaa tctataagct ttaagthttt aaggatctag taagtataat attagcttat
79201 ttgagtagaa ctcaagcaga atagaaattt gthttatatt taatagtgat aactctgaag
79261 acatagthtg tttattacac caaaaatata aaactactct tathtaacta agthtttatcg
79321 aaattgtgtt aacttgaaaa acatttggtat cagthtctat atthattgga gthttgggaa
79381 tathttattta taaatgcttg gthttthttt caagccaagt tagaatagag cactthttaga
79441 agathtttata agtgaathtt gcaatgctct ctggagtga gaaaaatcac atatacataa
79501 catacattaa tatacataca aacacaaata gaggtctcat agctthtcat ctgaaatatt
79561 agccatgaat caggcataaa tathctgatg gthaatthtt gacatctgct tgattgatta
79621 agagatacta acatagctgg aaaagcacaa thtctgggca caagtgtgag ggtgtthctg
79681 caagacactg agataaggaa gatccaccct gacccaatgt agataggcac tgatatggtt
79741 tggctgtgtc cccacccaaa tctcatcttg aattgtagth cctataatcc ctacatgttg
79801 agggatggac cctgtggtag gtgattgaat catggtgggt gthactgcca tgctgtthct
79861 atgatagtga gtgagctctg atgctctgat ggtthtaciaa ggggctthtt ccctthtgct
79921 cagcacttct ccttacagct gccatgtgaa gaaggactct thgtthctct tthtgccatg
79981 atgtgtaggc cctccagcc atattggaact gccagcccat taaacctct thgtctthtt
80041 tthttthttt tthttthttt tthttthtga gatggagtct ggctctgtct cccaggctgg
80101 agtgcagtgg cgtgatcttg gctcactgca agctctgcct cctgggttca cgcattctc
80161 ctgcctcagc ctcccagata gctgggacta caggtgcctg ccaccacccc tggctaattt
80221 tthgtattht ttgtagagac ggggtthtca tgtgttagcc aggatggtct caatctctct
80281 acctcatgat cctccgcct tagcctccca aagtgtctgg attacaggcc tgagccactg
80341 tgcccagccc aaacctctth tthctthtata aattgtctag actcaggtat tthttcatag
80401 cagtataaaa gtggactaat acaggcacca tccaattgat tgagagccca gatagaacaa
80461 caaggaagag gaaaggtgaa ttatctctct ctgaaactga aatathcttc ctccctgcc
80521 cttgacatcg gagctthtga gthtaccat tggctthctt gattctgagt cctthtgaca
80581 tggactgagc catgctacca gctthtccct thctccaact tggagacagc ctatcgtgga
80641 actthctcagc ctccataatt atgtcaacca attcccctaa tgagtcttht ctcatctatc
80701 tatctacata tatctatttg atthctgcct thctggagaac cctaatgtgg ttacaataac
80761 acaaaattca ctagthttata tggaagactt agthttthgct thtgcccat tthtatthtg
80821 tattataact gthtctggaa aatggaacaa gthttctgtct thtctatag agggctaaag
80881 cthttthtct actaatattt thggagattt ttaagattth cthttgtctt gacatacaat
80941 cttatgaagg ctgagaatta aaattattth tctatthttat thttcaggct caagtgtthg
81001 cthttgtaga thcttgagca cgttgagagc ctccaaggct tggagggggg tgcctaaagt
81061 ttcagtgatt atagggagt gtgagactca actgggaaag gaaacgtcta aacagaggca
81121 atthtgagaga taaaagthtt ctcaaaggag ccattaaagt tctaaataat tcttagtaaa
81181 gtcatgcaaa caggaaagga agtagacagg attagthtct tathgtgga acacatagtc
81241 agcggaggth tgggaaggga gaththtagc aactgagaag thcccatgaa aggagcaaga
81301 tcaagatctg atggaagggt aagagacacc atgaaacaaa atccaggat aagthccaac
81361 ccaagaggag aacagagagg cctcaaaacc aaagctagga taagaaactt ctagcctgag
81421 agthtacctc tagacaaaga agactgagat tccaacccag ctthcagagag tactcacatt
81481 ttgatgttac tcaaaactth ggctthttta tgacttagcc atgcatgcaa aaggcatthc
81541 ctaaggthgg acagaagacg gagccctat atccaaagat agccaaggag aaagaaagac
81601 ccctgtthgct agagccagtg gataaaggca acagaaaaag agacaagggt ccttatgtga
81661 tgagacctth tcagatthtag gcttatataa actcctgaga actgggagga tgagagccac
81721 agatggggta ccaacattht tactcattht attacaagth ggatagtatg gaaggtctth ttgaacgtth
81781 acaaaaatga caathtctag ggctthctgt ggatagtatg gaaaggaaag atthcttht
81841 taatgctgtc aactgaagag tgatgaagth catatathth acggagthtt actctgtthg cccaggctgg
81901 tthtatgtth cthtattctt thttthtgag atgagthttt cctccacct cccaggttca agtgactctc
81961 agtgcaatgg catgatctth gctcactgca acctccacct cccaggttca agtgactctc
82021 ctgcctcagc ctcccaatta gctgagatta tagatgcata ccacctgccc cagctaattt
82081 tthgtactth tagtagagac aggtthttcac catgtthggc aggtgtgtct ccaactcttg
82141 ctgttagatg atccaccac ctgagcatcc caagtgtctg ggagtacagg catgagccac

```

82201	tgcggtccaat	gagagatttta	tttcctataa	agggttacag	cctgcagggg	agttcttctg
82261	acaggctagg	aagtatagcc	tccagccaga	agccagaaac	agacattttc	aaatgtgagt
82321	taaaggaaac	agtaatttat	gctgagtggc	atggccaaat	acacatat	aataagctct
82381	aggaggagtc	atgaatat	atgaaaggag	aatgcggtgc	atgcgcaatt	gagtgtcttg
82441	ctccttcatg	ggccccatgt	acaaaaat	gcagtgttag	catgatccca	ggatggagtt
82501	ttcagccccc	taacactaaa	aggtgaagca	gaggacatga	aaactcactc	tgtgcatcct
82561	ctgtacgctg	gccagaacct	ctccgtcatg	ggtggtctct	tatcaggcaa	gaaaggagag
82621	gcggcttcag	gcagttgggt	gatatcagtg	gtggagtctt	tttcaagggc	tggtttctgt
82681	taaatcctta	gggaagaaag	cctcatcatg	gttagcaaag	gagaggggat	aacaagggtg
82741	atctgactcc	catcatccca	tgctggccaa	gctgagaact	cagttttgaa	agttactctt
82801	gggtcccttc	agccaagagt	gggtctgttc	agtcaagtgg	gagcttagga	tttcattttc
82861	atztatcatt	gctaattggga	aagggtacgc	tgtctccatg	gcagctgaat	tcgcaagaaa
82921	ctccttggat	ggggttaatg	gcagYtgtat	ttttctgKga	SctYKgcttt	aattggataa
82981	agtaagttct	ggtaagattt	cttccNttat	cttcagtatc	tcaaRtgttt	tcaYttaaat
83041	aatctttata	acaacttttg	atgtctgagt	ggaKtccac	acagtcatct	attgtaagac
83101	tttctgattc	cttttttttc	ctttgggtcat	tMtgaatagg	gcttctgtaa	ataaYtgc
83161	ggtagctttt	gWtKggaat	aacatcaaag	tagttgtcaa	aatacYtagg	aatgtKattt
83221	ttggattgta	aggKgagact	tgtttagctt	tRgaaaaaaM	tgMccaactt	gtaatgggga
83281	ggaaaaaaat	tttctNtggt	tttggaattc	ttagatggRa	cScKctgtaa	aaactgacag
83341	attaaaaatga	gaaaaaSaga	aaagttttaa	aacaYgtata	YcttatggWt	acatgggaga
83401	tactcaggga	aaaatgagta	aatctccaac	aggtggcttt	caRttcaagc	ataaatacta
83461	tcttcaactt	aaagaaagaa	gatttgaggt	gcagtgggtNa	gtggggagtt	aaccagcaaa
83521	agcacattag	acaagggtaa	gggtYgttat	acagacttaa	gtccaYgcat	tctccattga
83581	taagactctt	Yagtgattta	gttatccttc	tcttcttgKt	gtcgagagag	gtagctttta
83641	aatgggtgatt	tccttttatag	atgtaaattt	tccttacaca	agtgttaactt	ctactctRtt
83701	ttcacaactt	cgtttagcatt	tttttttttt	tcaaaataat	cagcttgga	taattcttaa
83761	gccaaaggga	catattttgK	gggtKgcata	tctggtttcc	taccattata	ttttgggggtg
83821	gcataKtttg	gYcttataca	ctgtgttcca	cYggcaatga	aaagagtctt	tgtttttcct
83881	ccagcaattt	gtcattttgt	agtttagcag	ttctaagagc	tatacaccag	ctgtgctatc
83941	tcactgtggt	tttcgggtct	ctagtatgtt	gagcatcttt	ttgtatgttt	acttgccatc
84001	tgtagatctt	ctttgggtgag	gttctgttca	gatctgtgtg	catttttcaat	tgggttggtt
84061	aacttattgt	ttagtttttaa	gattttttta	tatatatttg	atacaaattc	tttctcagat
84121	ctgtattttg	caaataattt	cttcaatatg	tggcttgtct	ttttgttctc	ttaacaagggt
84181	ctcttccaga	gtataaactt	taaataattaa	gaaatccaca	ttgtcatttc	ttctgtgtat
84241	atcaaccttt	tgtgtcattt	gttaaaattc	attaccaaac	ccaaaggcac	atagcttttc
84301	ttctatagtt	tcttctagaa	atggtacagt	tttgcat	tagtgtaagg	atgattttga
84361	gtgattattt	gtgtaagttg	taaagttttc	atctacacac	atatcatttc	ttatggtttc
84421	caattaactg	ttccctattt	ctgggaaaga	cacaggatag	tgggctctgt	tagagtagat
84481	agatagctag	acatgaacag	gaggggggaa	ctcctggaaa	agggaaagtc	tgggaagcct
84541	cacctggagg	taccaccaa	aattcacata	ttagtagcat	ctctagtgtc	ggagtggatg
84601	ggcacttgtc	aattgtgggt	aggtgggaga	agaggtacct	atgcagaaag	aaacacccta
84661	gaattcctct	taagatgccc	caatcatcat	tcattctgca	ataaaaaatgt	catacatcta
84721	ctctactgca	cccagccctc	ttctgcaatt	tcaataatca	attgtgctat	ttgcctttct
84781	ttcagcaatg	agattttatt	tttctttcct	aattatttca	aacatgaact	ttggttccag
84841	agaactagta	tttccctgat	ttataaattg	agggcagctg	ggcatgggtg	ctcacgcctg
84901	taatcccagc	actttgggag	gccaaggcag	gcagatcact	gaagggtcagg	ggatcaagac
84961	cagcctggca	aacatggtga	aaccccatct	ccactaaaac	tgcaaaaaat	agccagccat
85021	ggtggcaggt	gcctgtagtc	ccagctactc	aggagactga	gacaggagaa	tcgcttgaac
85081	ccgagaggtg	gagactgtgg	tgagccaagg	tcgtgccact	gcactctagc	ctgggtaaca
85141	taggggagact	ctatcctcaa	aaaaaagata	aaaaaattga	gggtcatctc	acagaogato
85201	taataatgaa	ttattttttt	gtcttttagaa	aatcaacatt	aacttttcta	cttttagata
85261	tcgtaactgc	tgtgacttga	aggacttato	tagaaaaagc	cttaaaaaac	tacgggtcagc
85321	actgggtgaa	tgggttgggg	gaacccacat	aaaatcccca	agacacctgg	gagtccatgt
85381	ccccatgagt	gggactgcag	gcagctgtag	cagactggat	gggagagggc	agcaggcagg
85441	agaactcggg	gtctggagtc	cacgggttcta	aggccaggga	aaaccactgg	caaagtga
85501	tgcgagagctt	gacaggatga	aatttgtgat	tgtaaatgaa	tatttgccat	ttccaagtga
85561	gatcgccagt	gggtgggtgga	tggatgggtg	cccctccaag	tgggctgcag	tgaggagagc
85621	gtggcaccag	gccaggatgc	tcctgccagg	aacacaggat	ctgcacacgt	ttaggaggaa
85681	acgctgggca	gaccagctt	ggagtcatct	ctgctcttta	catctgttaa	ggctgtgaaa
85741	actgagagtc	ggccggatgc	agtggctcac	gcctgtaatc	ccagcactct	gggatgccga
85801	ggcgaatgga	tcacctgagg	tcaggagttc	aagactagcc	tggccaacat	ggtgaaaccc
85861	catctctact	aaaaatacag	aaaattagcc	gggtgtgggtg	gtaggtgcct	gtaattacag
85921	ctaactcggga	agctgacaca	gaagaatata	ttgaacatgg	gaggcagagg	ttgcaatgag
85981	cagagatggc	gccattgcac	tccagcctgg	gtcacagagg	gagactccgt	caaaaaaaaa
86041	caaaaacaaa	aacagaaaac	tgagtctcag	gaacagttcc	cgagaaggaa	aattgggccc
86101	gcatggaaat	agacattttt	ctcccaccta	gggcaggagg	tgaagtga	taggtctgtg
86161	gagtggactt	tcacatagaa	accatgtatt	tcctaaattg	ggggttattt	gggatcacc
86221	tggaggagta	ttcctgggtt	tgggtgaaaca	cacgggggta	ttttttgtga	agctgcaaat
86281	ctggcacagc	aataacRgct	ggggaactgg	agatMaagga	gaaggcatac	taagtgtgtg
86341	tgcaagtttc	ccagaagtat	gacattattg	ggaagtaa	tactttttta	aacaaccgtg
86401	gcaataccac	gtcagtaagS	cagagacaac	accatgaagt	ttcatgacag	aggccaaatS

86461	cagcccaaac	ccagcccagc	agaggctgtc	aactcagcgc	cccagcgaga	gccggaaggt
86521	tccatcctca	gagctgcaga	ccctctcgtg	tgggctgcaa	aggccatgtc	tgcattcccgg
86581	gcggtatgta	cgctctgaga	gatacatgcg	tgttccgggg	gttatatgag	tgtgacgggt
86641	gtggcgtgag	tctgactgtg	tcacgggcgt	tccagggggt	acgtgtgtgc	tctgagggac
86701	acatgcgtgt	tccRgggRtt	atatgagtgt	gacggStgta	gcgttaggtg	acRatgtcat
86761	ctccgMgttc	caagcgttat	gtgcgcactg	agggaacacat	ccacgttccc	ggggttggat
86821	gtggaaggca	gctaccccga	cgggtgtgct	ctctgcatac	gacgggtgct	aacactagca
86881	tcacagatgc	agtgttatta	gtactacgga	ggttattatc	agtgtggcgg	gtgttctaata
86941	tgccttccctg	acgctacatt	tctgttccaa	gaccgcagct	tggccctgtg	gctgcctcgc
87001	cttgggtgtg	gagaatgaac	ctcgagtgcg	ctggattcac	aggggatttt	ggtttctaata
87061	tttccacatg	aagggccaaag	gcgggtggat	cacttgagat	caggagtcca	agaccagctt
87121	gggcaaatag	caagaccctt	gtgtctacaa	aaaaaaaaaa	aaaaaaaaaa	tagatggcat
87181	gcttgcacgt	acctgtagtc	ccagctaccc	aggaggctga	agtgggagga	ttgcttgagt
87241	ccagaagttt	gaggctgcaa	tgagccagcc	atgatcgcac	cactgcactc	cagcctgggc
87301	gacagagtga	gaccctgtct	ctctctctct	ctctctctct	ctctctctct	gtcacacaca
87361	cacacacaca	cgtaaatttt	gttggttat	atatttaggg	ggttgagcac	ttttgggttat
87421	aaaatatatta	tgattgtggg	aacaagttaa	taaagacacg	aaacttattt	aaatgtccca
87481	gaactttaag	aacaaaaagc	attcttagtt	taaaaataag	ttttacttta	aaggtaatag
87541	tacacacata	aattgttggt	aaaatcgaca	gtaacaaaga	gaagtaacaa	tactaatggc
87601	ctgtcacaaa	ctgattctta	ataacctata	taaacaaacg	ttaagcccgg	gcgctgggtg
87661	gctcatgcct	gttatcccag	cactttggga	agccgaggca	ggcagatcac	ttgaggccag
87721	gagttccaga	ccagcctgac	caacatgggtg	aagcccagtc	tctacaaaaa	atacaaaaaa
87781	attagccggg	tatatggca	tgcacctgta	atcccagcta	cttgggaggc	tgaggcagga
87841	gaatccttga	accaggaag	cagaggtcgc	agtgcagcca	gatcatgcca	ttgtgacagg
87901	agagaaactc	tgtctcaaaa	aaaaaattat	atgtttacaa	cagggtgcatt	cctcctcttg
87961	ctttctgagg	acgccctgct	atgtagctga	gtagtcgcta	ataaactatc	ttaacttcac
88021	tatactctgt	gacttgccaa	aaggctcttc	ccatgtgaaa	tccaaaaacc	tattcttggg
88081	gtctaggaca	agaccatttt	tataatgaca	aaactataca	aattctagag	gaaaacatgg
88141	aaagaaagct	atgtgacctt	gSgtttggcc	atgagtttta	acacgacact	atcagaggca
88201	tttgaacccc	tcctctaYat	gaactccagg	gtgggttatg	ttccaYtggc	taagRgaaag
88261	ttttcttcaa	aaatgtgaca	tgatttgagg	tcaaacatta	atatcaagKW	aactcaaaag
88321	attgagaagc	tagcattagt	tctgggaaaa	ccagaagtgt	gccttttttt	ggaaataatc
88381	attggtagca	caaacttaag	aatctccaaa	ggaaataaaa	atgagttatt	aacttacagt
88441	tttcaccaat	taagatataa	atgaagctaa	Ygaaatccgg	aaatacaatt	tactgttttt
88501	taatgttcat	taaaaaaaaa	aaaaaaaaacc	ttatcaaata	gccccagtaa	gtcaccaatt
88561	aagtctttac	tacttaaaaag	caaaatccac	ctatgtcctg	aacacttatc	cactttacRa
88621	gcctcattat	atgtactgga	gacaaaattc	agaaataaat	aaatatatat	gtacatatat
88681	acaaatatat	ttcaaattaa	aaaatacttt	tagagagtgg	tatgtattac	atttagaaat
88741	taataacgaa	gtaaattatg	ggatgtcatc	cacgcctgtc	ccaaaggtag	cgaatttata
88801	aatcatctca	ggtgcggagc	aggacagggt	gaaaatagga	atgacatgaa	cccgcgcgga
88861	acagctgccg	gcgcgggtgtc	cagggcggga	ccccgcccgg	tccYggcccc	tccagccctg
88921	ggcccgaacc	ctactacgcc	tctgcctcga	cgcgaacgcg	gagcccagagc	gcgcgtcacg
88981	ccgtgtgggg	ccgaagaggc	tgctacccag	aggcggagtg	cgggctcgcg	aggggtcccca
89041	cccSactctc	gctcccggca	gcacctacgg	actcgcgtcc	ccgccgcgcg	ccgactcggg
89101	agcagcaccg	cccccgccac	aggagcctca	cgcgcctctt	acctaacagg	aagttgggtg
89161	gaagcagcgc	ggacccacgg	cacaccgaac	gcactccaac	agaacccgac	gcagacacgc
89221	gctttcaacc	ggcggagaca	ctggcagggtc	aatagagata	ttgactatat	aaacaaaaga
89281	atgacaaatt	aatagtgtaa	tggataactt	gactttggca	aatattgtga	atttttgtga
89341	aagtacaact	aaaaggcaat	gtcactccaa	taatcaccag	agtaatcaat	ttgcttattg
89401	ctgtcccttt	aaatatagtt	ctctgggtatc	aactaacatg	tttttaacta	atgatgcttc
89461	ttaaagaaaa	gggaaaagac	ctttttcttt	ctttcagttc	tcaatgattc	actgcttcat
89521	ctcgtctccac	caaagataaa	tgaaatctac	atctcttata	cattaacaat	gcatgacaat
89581	ttacaaatag	ctaaattttt	ggagctaact	ttaagtacct	gaatggaatt	taatcaacc
89641	actaatctcc	ttctcacttc	tcagttattt	atcaagttta	tgtcaaggga	caaggaaaaa
89701	ttatccaaac	attgttttaa	acaatcatca	tttaattagta	acacttatcc	agggggggtt
89761	ttaacctttc	ccccactcaa	ggattattct	aatgtcagag	tagaataaaa	aataagtga
89821	gcgatgctga	ctcttccaag	cttaacattt	ctcacaagtc	aattagcttt	gtactgggag
89881	gagggcgtga	agggtctgctt	gcggtagttg	tgtagcagca	gcacaatggc	cgcagacaag
89941	gaaaacagtt	tctaaaaatt	cctcgtatat	aattttatat	ttttgacaag	attaatgacc
90001	catgctccct	tcctctccat	ttcttttttt	ggaattctgt	tggtatgtag	ttactatatt
90061	ttattaaagg	aaattagcct	tatctctttt	tatattttat	taaagaaaat	tattatatta
90121	ttcctttata	tttttattaa	aggattttat	tattattaaa	ggaaattagc	cttatctctt
90181	attatatatt	ttatgacctt	caaagtagtg	tctctgttta	aaagtgtacc	ctggccgggc
90241	gtgggtggctc	acacctgtaa	ttccagcact	ttgggaggcc	gaggcgggtg	gatcacgagg
90301	tcaggagatc	gagaccatcc	tggctaacac	ggtgaaaccc	cgtctgtact	aaaaatacaa
90361	aaaattagca	gggcatagtg	gcgggcgcct	gtagtcccag	ctactcagga	ggctcaggca
90421	ggagaatggc	gtgaacccgg	gagacggagc	ttgcgggtgag	ctgagatcgc	accgctgcac
90481	tccagcctgg	gcgacagagc	aagactccgt	ctcaaaaaaa	aaaaaaaaaa	NgtRtaccct
90541	gaagcacaca	tcaagcgaca	tgtagagtcc	ataaattctg	gccaaatggg	catacctcaa
90601	acctcatcag	caStaaggct	ctttactttg	actgacaaat	atgaacgctg	gggaatttgg
90661	aaatgatata	taatatataa	tattatataa	ataatagata	tataatatat	aatatatata

90721 atacatatat aatattatat atgtaataga tataacaatat ataatatata atagatatat
 90781 aatattatat ataatagata tataaatatta tatataatag atatataata tataactttc
 90841 catgtgattt

ELP3 genomic sequence (SEQ ID NO: 4)

>8:27927301-28022150

1 gagaaaataa ttcaaagttg tattttaaagt ttcagagggg gaataataacc aggatccttt
 61 ctcaaaaaag aaacacatgt ctggaatagg cagtgatgtg ctgcagccag ctcgtaggag
 121 ctcttgaaag ccaacagcac acatcacttt cctactctgc attcagtgac gtcacactgg
 181 tagcttgaaa ttgacaatgt tgggactgtt Ycagtcctga atctcaaact gataacccaa
 241 atccataacc acattgtgat ccctaactct caaccaataa attccagctg acatgtgacc
 301 acagcttatc aataactaaga ggcacatcat ttccctgttt aagatttctg aaattgagat
 361 gcatcttgca actgctatag accaggtgac aatcacaagg tgggtgtcac tgcctgcgtg
 421 ttatgggctg aaatgtatcc ccctccaaaa ttcaaagtgt gaggtcccaa tcYccactaa
 481 ctcttattta caccacagga attggcaaat ggtacacatc agccttttgg gttttttgtt
 541 tgtttgtttg ttttggggga tttttttgtt tttaaacaaa gagctagtgt ttaaacattt
 601 acaagcgcaa cgcaacacaa acctggctaa ggtcctagaa aagtgcacgt ttcttaagta
 661 gttagttagt aatcatacac attttaatgc agactaatgt tgaaacatta gtctgggtgc
 721 ggtgggtcac acctgtaatc ctagcacttt gggaggccaa ggcaggcgga tcacaaggtc
 781 aggagttcga gaccagcctg gccaatatgg tgaaacccca tctctactaa aaaatacaaa
 841 aattagccag gcatgggtgg gcgcacttgt agtcgcagct actcgggagg ctgagacaag
 901 agaattgttt gaacccggga ggtagaggtt gcaatgagcc aagatcatgc cactgcactc
 961 cagcctgggt gacagagaga ttccatctca aaaaaaaaaa aaaaaaaaaaag tcaagcaatt
 1021 aagaattatt tgaggggagt tttttttgtg cttagaaaaa cagtgtcgtg gagaagtcac
 1081 actagaatca tatagaaata gcattacata ttctttcatt cttcttactt aaaaaaaaaaag
 1141 agaaaaacat tcacctatag aatgtgcatg tgcgtgtgtg ggtatttgag ggaggtagaa
 1201 agcagtgaag agttgtcaat ctctttctga tgcaaagata taaagagctg agtgagtaga
 1261 cgccttgca gtcactggga ctggtgagaa gccgtgtccc tggcaagcta taagcacgtg
 1321 tagttaaggc tggaatacgg atatctgtgc agactgccag aagcccaccc ccaccaaccc
 1381 ccttatagag tgagctgaag ttgcaaaaaa aatctatctg ctgagatttt gctttgattg
 1441 agttttcact ctaggaaaaa gtttagggaa agctgaaact attttctact gggagatgaa
 1501 attaatgtag aattaagttt aagtagagtt ttaaaRcagt tccaagaaag gcatgtgctt
 1561 agctgtgtcc agatgtttgc attatttaaa atctggacct aaatcttgta taacttttct
 1621 aaaaattact gaagattagt taacatttat gctttttatt gtagtaaaaa gaaatgtttt
 1681 tatagtgtca gtgaagtgc tctagtataa agggttcata ttattgtaaa agagaagtag
 1741 aaacagctac agctagaggt aggatccaag atgttagtag atattcatta aattatgcaa
 1801 cagaaacatt acacactgtt ctaatttaaa cacatggctt gtcataataa aacgtaacac
 1861 aatatattaa agtttgtaaa aagatgttgt atgtgagaga ggagaaaacg tggagagctc
 1921 aaccagaagg gaggttaggt gtggtggctc acacctgtaa tcccagcact ttgggaagcc
 1981 gaggcagggt gattgcctaa gctcaggaat tcaggaccag cctagccaac atggtgaaac
 2041 cccgtctcta ctaaaaatac aaaaaattag tcgggcatgg aggcacacgc ctgtagtccc
 2101 aactactcgg gaggtgaag caggagaatt ccttgagcct gggagacaga ggctgcagtg
 2161 agccatgatc acgccattga actccagcca ggacaacaaa ggaagacact atcttaaaaa
 2221 aattaaataa aaggccgggc acggtggctc atgcctgtaa tcccagcact tcgggaggcc
 2281 gaggcgggca aatcacccga ggtctggagt ttgagaccag cctgatcaac atggagaaac
 2341 cccgtctcta ctaaaaatac aaaattagcc aggcattgtg gtgagtgcct gtaatcccag
 2401 ctactcggga ggctgaggca ggagaatcgc ttgaaccagg gaggcagata ttgttgtaag
 2461 ccaagatcgt gccattacat tccagcctgg gcaacaagaa caaaactctg ttaaaaaaaa
 2521 agaaaaaagg aaaggaaaag aaaggaaaag aaaggaaaag aagaaagaaa acagaagggt
 2581 tattcaatgg aagcagaatc agaaaggata tagtaaaagt ggagttacac tgaaaccagt
 2641 aatatcaatc atgaccacgc tgggtgaggt ggctcatgcc tgtaatccta gtactttggg
 2701 aggctgagac aggtgggtca cctgaggtca ggagttcgag accagcctgg ccaatatggg
 2761 gaaaccctgt cttcactaaa actacaaaaa ttagccagtt gtggtggcgc atgcctgtaa
 2821 tcccagctac ctgggagact gaggcaggag aatcacttga acccaggagg cagaggttgc
 2881 agtgagccaa cattgtgcca ctgcattcta gcctgggcaa cagagccagg ctccgtctca
 2941 aaaaaaaaaa aaaatcatga cctgattttt aaaaatctac ctgaaatcag tgacataaat
 3001 catgactcat tttttaaatc caccttttct agctttgtca tgaaaattat gttgcagtga
 3061 tgtcactctg ccactgtctt acttgtatga aataatttga tctgagcccc tagcactctt
 3121 tttttgctgt tgttagagat gggggtcttg ctatgttgcc ctagctgggc ttgaactcct
 3181 ggcctcatat gatcctccca cctcggcctc ccaaagtgtc gagattacag gtgtgagcca
 3241 ctgctcctgg cccaattatt atttttaatg ttattctcgc taaaagaaac ccagattcc
 3301 tggggagtag ttgttccata tcttggggca gggaaaaata aagtgaacct gaatatcttg
 3361 ttgtagctag acagcaagaa tgttttttaa atgctaaagg gagtaatgct aaaggagtc
 3421 agcttaaagg gttccactg gccaaaaagt gacacattga gcatcagaat gaacacaata
 3481 gttctgtgaa aagctatgag ctcatatga tcctaaaact gagtaataa aataagggtat
 3541 gttaaagtaa aggcattaac cacctcaaac aatatatgcc tgagactgtc aaaattcagt
 3601 ctgtaaattc cacttgggca agtcctaaaa gtttacctaa catataaaag aatattaaca
 3661 gtcttagtag gggcacaaaa atcctgtcag gtcaaactag gcagtaaaac tttgtgaatt

```

3721 aggttaaaat aaaaagtcgt gtgacagttt atagtaaaaa ctgagccaag gcggccaggt
3781 gcattggctc atgcctgtaa tcccagcact ttgagaggct gagggcagat cacctgaggt
3841 cgggagtttg agaccagcct gaccagcatg gagaaacccc gtctctacta aaagtacaaa
3901 attagctggg cctgggtggcc catgcctgta atcccagcta cttggggaggc tgaggcagga
3961 gaattgcttg aaccaggag gaggaggttg cggtagacca agatagcgcc attgcactcc
4021 agcctgggca acaggagcga aacaaaacaa aacaaaacaa aacaaaacaa aaaacaaaca
4081 aaaaaaacca aactgggtca aggcaaaatt taagggaagg tcaagtgaac cataacatac
4141 caggtagtaa gaaaagatgt ggagctagaa agcctcgtta ctataggatg gggcccaa at
4201 caggcatctt ggaaggatct atgtgcctgt gtctcagcct tgaatctcaa actagtaact
4261 caaatccata actacattgt gatccccaat cttcaaccac ttaacttcag ctgatatgtg
4321 actacagctt atcaatacta agaggcacat tgtttccccg tttaatattt ttgaaattga
4381 ggtgcatctt gcaactgctg caggccaggt ggcagtcaca aggtggttgt cactgcctgt
4441 gtgttatggg ctgaaatgta tccccctcca aaattcacat gttgaggtcc taatctccac
4501 tacctaaaaa tgtgacctta tatggaaatt gggtcattga ggatgaaatg tattaagatg
4561 aagtcataat ggagtagggg gggcccctaa tccaatgact ggtgtcttta aaaaaagggg
4621 aaatttgat acagagacac acacatgagg agaatggcat atgaagactg gagttgtgct
4681 gccacaagcc aggaattacc agaagcaagc agacagaact gtaccagatc cttcctgcag
4741 tttcagaggg agcatggcgc tgctaatacc ttgattttgg acttccagcc tccagaactg
4801 ggagataata attttctgtc gttccaagct acccagctgt ggtgcttagg aggttcatac
4861 actgcacatg ggtgaacttg gtcacagctg ttcacattgc cttccttct aatgagttgt
4921 gtgcattact taactgccat ttaatatgtc ttttaaaaga ttatgttatg attcagcatt
4981 gaaaggctcag cattttccag gccgttacat cgaaaggcct ggaaatggaa acgtggggca
5041 tatacttgat gttagtggaa gtatggttg tgtagacagt aattccagat ttttttgcaa
5101 agcaacacct aagtgttca tgggacctag gaaagggaga catccacatg tagatgaagg
5161 tgggttgtgt tttgatactg aggtgtatgc aaagtgactg cctatcccac acccagccaa
5221 aaaaaaaagt gatggaaact caaagaatgc cttataaaga acttctgtct catgttttct
5281 gtgattaaaa ctaaatttgc tccaaggcta ggcattgttg ctcacacctg taatcccagt
5341 gctttgggag gccaagcag gagaattgct tgagcccagg aattagagac cagcctgggc
5401 aacataccct gtctctacaa aaaattttaa aattagctgg atgtggtgg gcataccggg
5461 ataccggtag tcctagctcc ttgggaggct ggtggtggc agggggtgcg gagtgcgggc
5521 aggaagatag cttgagccca ggaattcaac gttgcagtga gttatcattg tgccactaca
5581 ctccagcctg gctaacagag tgagacccat ctgggaaaaa aaaaaagttc caaacaacRg
5641 catgtagtac aagtaaagg ttcacaataa ttcaaactga aataaagtgg ttggagaatg
5701 aaggcatcac cttgccatca gaggtgtggg ttttaggcct cagaagaact tgcaccatag
5761 cggtgacagc tatagtcacc ctgcaaactg atgtattgct gccaggccc taactcatac
5821 aaaccaattc ggcattgtta ctggcatagt tgtaaattgt gtattgaagt attctacgtt
5881 tccatttcca gggataatat gatcaggcac tcatacaatg catatttatt taataccaac
5941 aagaacaatt caacagacca agaccagctg tactaagttt tgcctcgtta aaactggcat
6001 tcaagaattg cctgatagaa tattttggct taagtatgag gcctaattgat attgcgctag
6061 aaacaaaagc tttgaaattt tcaattccac gttgcacaac agacattttc tgtatcaata
6121 ttattgaagg caaaatacag aaagaaattg aatatagagc tggtcatcgg ccaaattgtt
6181 ttactattga atccaatacc gaagattttg tttcagccaa acatatcatc tgtcacatgg
6241 tacttactct gatatatccc ttatgttgtg ttgtttatat tttatcttaa acttggtttt
6301 agttttatag ttgtacaaga ctattatagg ccagacgtgg tggtcacgt tggtaatccc
6361 agcacttttg gaggccgagg tgggtagatc accagagggtc aggagtccga gaccagcctg
6421 gctaacatgg tgaaacctca tctccactaa aaatacaaaa attagctggg catagtggca
6481 ggcacttgta atcccagcta cttgggaggc tgaggcagga aaatcgtttg aaccaggggg
6541 tcagaggttg cagtgagccg agattgcacc actgcactcc agcctgggca acggagcgca
6601 actctgtctc aaaataaaaa agttaaaaaa aaagactata ataataataa gttgtatgtt
6661 tgtacctact ttagtgataa aatagtaaaa ataggagaac actaagtgca gctcaggcct
6721 tatccctgtc cactccctct cacactctcc ctctgagcct ttccaagcta cttgcctgtc
6781 attcgccaaa cacagcagcc tgtgtgaacg gtgttcttgc ttctgcctca aaagtgcctt
6841 ctcgactttt tcaccttact aaagactaca gcttctttta aattctgtct tgcagagcac
6901 tgtggtgctt gccgagctgt agtcccagct acgtgggagg ctgaggcagg aggatcactt
6961 cagcccaaga gtttgagacc agcctgggca acatagtggg aaccccatct ttaaaaataa
7021 taataataaa attggccagg tgcagtggct catgcctgta atcccagcat tttggggaggc
7081 caaggcaggc agatcacctg aggtcaggag ttcaagacca gcctagtcaa catggtaaaa
7141 ccctgtctct actaaaaata caaaaattaa ccaggcatgg tgaccagcct ggtcaacatg
7201 gtaaaaccct ctctctacta aaaatacaaa aattaaccag gcatggtggc atgcacctgt
7261 aatcccagct actcaggagg ctgaggcagg ataactactt gaaccagga gacggaggtt
7321 gcagtgagcc gagtttgtcc cactgcactc cagcctgggt gacaaagtga gactaagtct
7381 caaaaaataa taataataaa ataaaattct gctcagaggc tgagttttcc ttgaacacct
7441 cccagctccc acctctctg ccaccagtgt gacctggcat ctttctccg tgtcccatag
7501 cactcaacaa ttctctcact gtatggagag cccagactca cctgggccta ctctctgtg
7561 gaccacatgc tcattcgacc ctctcaacaa tcacgggaga tagatatcat tatctccctg
7621 ctttaaagat gagaaaatgg tgcctcagag aggttaactga agcagtagga ctgagttaaa
7681 tccaaactgt ctcttatagg tcagtaatcc cagcactttg ggaggtcaag gcaggtggat
7741 cacttgagcc caggagtttg agaacagtct ggacaacatg gtgcaatccc atctctacaa
7801 aaaatacaaa aattagccag acatggcggg gcatgcctat agtcccagct acttgagagg
7861 ctgaggtggg aggatctctt gagcctggga ggcagagggt gcagtgagtc aagatcacac
7921 cgctgcactt cagcctggcc aacagagtga gaccgcgtc tcaaaacaaa agaaactaac

```



```

7981   tgtctattcc aaaacttttg cccttgcaac tacacaatac caggcataca tttgtctccc
8041   aaaatctagt tgctgggata cagaaaaaca catagagaaa cctattaact caccttcagt
8101   ttttccttga gaattctagt cctttgtagt tttatcattt catttctttc taaaacagcc
8161   tctcgctgac tctgaatagc ttgctaggtt gtgaaaggaa atagaagcat gcagagagta
8221   gcgttatcaa cagtgatgag gtggcaagat gcacattttt ttggcagatt ttcatttggt
8281   ccaaacagtc aaatatgcat gcactgtatt agaattatac acagttgccg ggcacgggtg
8341   ctcatgcctg taatcctagc ccgttgggag gccaaaggtag gcagatcaca agctcaagag
8401   atcgagacca tcctggctaa tccagtgaac ccccatctct actaagaata caaaaaatta
8461   gctagggcgt gcggcacgtg cctgtagtcc cagctactcg ggaggctgag gcaggagaat
8521   tgcttgaaca caggaagcag agcttgacgt gagtcgagat cgcgccactg cactccagcc
8581   tgggcgacag agtgagactg tatctcaaaa aaaaaaaaaa aatacacagt tgacccttgg
8641   actacatggg tttgaactgc gtaggtccac ttatacgtgg attctttttc aataattgaa
8701   aaagatttga agatttgcaa caatctgaaa aaactcacag acaaaccctg tagcctagaa
8761   gtatcaaaaa attaacaaaa aggtgtcatg aatacataaa atagatgtag atcccagttt
8821   atatttgata atgtactacc acgaaatgca cagattctta tcatgaaaag ttaaaattta
8881   tcaaaacttc tgtaaactc tatagactac atggcaccat tggcagtcac gaggaatgta
8941   aacaaacatt aagatgcagt attaaatcat aactgcataa aattaactgt agtacatact
9001   atactactgt aataacttca gagccacctc ctggttgctgg tgtgggtgagc tcaagtgttg
9061   caaatatcca cttaaagcgc caaacaccat gtgatactaa tgatctccat gtgaacaact
9121   gctccagtaa attgcgtatg gcaataaaaa gtgagctctt gcagttctca tgtatttttc
9181   agcctgttta gagcaatacc cttaaacttg aataacacca tcggacccat gtgaagtcca
9241   gtgatcctgg aggggctccc aagtagcaga gaaaagtcac gacattacaa gaaaaagttg
9301   aatcgcttca tatgtgccgt agattgaggt ctgcagctgc tgttgctgtt catttcagat
9361   gtacgattca tcttgtaaac agatgaagta aacttatgct attgataaat acgggtgccgt
9421   attgtaaatg tattttctct tccttatgat tttctttcct tttttttttt tttttttgtt
9481   gttgttggtt gagatggagt ctactgttg ctgaggtgg agtgcagtgg cgcgatctcg
9541   gctcagtgca acctccgcct ccaggttca agtgactgtc ctgcttcagc ctactgagta
9601   gctgggatta caggtccatt ccaccaggcc cagctaattt ttgctgtttt agtagaaacg
9661   gggtttcacc atgttggttg ggctggctct aactcctgac ctgctgatcc gccacactca
9721   gccttccaaa gtgctgggat tacaggcatg agtcaccaag tcctgccatg attttcttaa
9781   tgacattttc tttctcttag ctacttatt ttaagaatac agaacataat acatacacia
9841   aatatgtatt aatcgactgt ttatgctatc ggtaagactg ccaatcaaca gtggctatta
9901   gtagttaagt ttttggggaa tcaaaaatta tgtgtggatt ttcaattgag caggaggttg
9961   gcacactaat ctctacattg ttcaagagcc aactgtaata tcagtcataa aaagtattat
10021  ttaaaaagaa ttagttcagg ccgggcgcgg tggctcacgc ctgtaatccc agcacttttg
10081  gaggtgaag ccggtggatc acctgaggtc aggggttcaa aaccagcctg gccaacgttg
10141  tgaaacccca tctctactaa aaatacaaaa attagccagg catgatgggtg ggtacctgta
10201  atcccagcta ctctggaggc tgaattagga gaattgcttg aacctgggag gcagagggtg
10261  ccgtgagccg agatcgcgcc aatgcactcc agcctgggtg acagagcgag actctgtctc
10321  aaaaaaataa aaaataaata gataataatt taaaaataaa aataaaaaaa actagttcat
10381  acttacattt cctgcctttc tttccctgaa atgaaattag aaaaatgtaa caattactta
10441  atttttacta tgtgtcactg cagtctttcg actttcccca aaagcagcac acactccctg
10501  tgtctgtgcc ttttcataag ttctttcttt gacccaatgc tctctcttct gacccatctc
10561  cagcatccac ttgaaaaaag tgcccttcatt tctcaacggc cagccagcgt tttgtcagct
10621  gtgaacattt tctgtgacct cactccctgt cccagtcaaa aatgcagccc tctcacctg
10681  ggttcccata gcacctggct tgtcccttca tgtataactt ttaaccctct tttagatgg
10741  gagctcaaag actgggcaat gtgcctctga atccacagcc cctacctatg ttcaataaat
10801  gcttatcatt aataaattag atttaattat gttaattttt tttttttttg agacggagtc
10861  tcaactctgt gccaggctg gagtgcagtg gtacgatctc agctcactgc aacctccaca
10921  ttccaggctc aagcgattcc cctgcctcag cctcctgagt agctgggact acaggtgtgc
10981  atcaccacgc ccggccaatt tattttgtat ttttttagtac agatgggttt caccatgttg
11041  gccaggatgg tctcaatctc ctgacctgtt gatctgcccg cctcagcctc ccaaagtgtc
11101  gggattacag gtgtgagcca ccacactcag cctaattgtg ttaatttttag tgttggcatt
11161  ggaaaggagg ggctggagat attctctgct ggggtgagat ggggagaaat gcaggaggaa
11221  aaaaatgaag ctgcaattcc aaccagacc atgacagcaa gggaattcct ggagacagca
11281  gtcagacctc agcttcagtg ggtgtggagg aaatggtgga ggggtgttaa aggagctctt
11341  gttggagggt agacgcaccc gtgacatcac atcccgtgag cacacacccc atggatccag
11401  gaaagcccag tttatacccg ctgatccctt ctaaggacta atcatacccc ctctcactct
11461  caaaattgtc ccaatataga aggttagtta tagtcttctt aactataggg acaacagagc
11521  tctccataga aatcaacatc tattaagccc aaaaatgcat acctttcatt gtaatttgtt
11581  ataatacaac tcttagagaa tgcactctac ttctcccga gttctaaaaa ttttgaggac
11641  ctgttccaag tgagttaaaa agttcaggag tctctggctg gggatgctgg gcttgatacc
11701  taggtgatgg gttgatctgt gcatctaacc accatggcac atgtttacct gtgtaacaaa
11761  cctgcacatc ctgcacatgt accctggaac ttaaaataaa aataaaaaatt taatgatttt
11821  taaaaagctc aggagtacaa aaacctgaaa catcaaagct gtaccctggg ctgggtgcag
11881  tggctcacac ctgtaatccc agcacttttg gaggccaagg cgggcagatc acctgaggtc
11941  cggagttcaa gaccacccc gccaacatgg cgaaacccca tctctactaa aatacaaaaa
12001  ttagctgggt ggaccggccg gcgcctgtaa tcccagccac tcgggaggct gaggcaggag
12061  aattgcttga acccaggaga cggaggttgc agtgagctga gatcgtgcca ttgcactcca
12121  gcctggggcg cacagcaaga ctctgtgcca aaaaaaaaaa agctgtaccc taccagatag
12181  gattataggg tgtacccctt agttatgggg gcatctacac tttctacatc tgtggagcag

```


12241	gtgggatcat	cacatcacac	agtgcaggag	gtacaccatc	tgcattctggt	acatgtgagt
12301	ggcaccacca	gagctgtgta	ggggacacca	gcttggcact	aagcagctac	cctggaaggt
12361	tcagattcct	aagacaaccc	aaccaagggt	cctgatgtcc	caggaagtca	cccagccttt
12421	tctttcctcc	ccaacaatca	cttcctgaag	ccctctaacc	acgttacaaa	gtcaagctcc
12481	atgctactgt	agtcaggacc	cacagaggaa	agcccttgac	tggagcccac	atccttgcaa
12541	gcccagcaca	ataccttagg	tattctggca	agtggagttt	gtccatcttg	gtgaccacca
12601	gggccacgtc	cctacagaag	ccccgctggc	aggctttgat	gctctcattc	agaaggtctt
12661	cgtgggcttg	ccccccagaa	actcgctcta	tgtcgctgat	caccagatc	actgagcact
12721	tgtcaatggg	ctgcaaaaaca	tgaccacggc	atgtgtcagc	acaggaatgg	agtcacagtt
12781	cctgaggacc	ggttccctaa	tgtatccctt	aagcctctcc	ctccagtccc	accctcacc
12841	gctccccacc	gcactctgtg	cactagctgg	actgagctat	gagtcatttc	tcatatgtgc
12901	cttgttctgt	taattccctg	gccacagcct	ctgcctagcc	cccatctgtt	cctcaagact
12961	gtggaggacc	tctcgggcat	tgggctggcc	tctgcatcct	gtaacacctg	gacttacctc
13021	aagcagcgcc	tctgagacac	agtgactgca	ccaggctctgc	tctctgcccc	ttgatgggaa
13081	gcgactgtct	gcacctttcc	tcttgggac	cacctcacct	caagcccagt	gcttggcaca
13141	caggagaggc	ttcacagaag	tttgtggcat	tagagattga	cagaattccc	taaatcagtc
13201	ctccagtccc	agtcaccagat	ccatcactgg	cttgctttat	ctcagttgtc	ccctggggaa
13261	aattcttgtt	tttccagaac	taggttttgg	ggtgcacct	ccctcaagct	gtcacctgac
13321	ggcagcattt	tgatgtttga	ctgccccctg	acgttttagt	caatgccacc	agatggcagc
13381	atggagccag	aaaccatatg	acaagttgca	aaggccaatg	aacatgaaac	aacataatgg
13441	catgaatgtt	gctttattaa	atatgcaact	ttcacatgac	gatcatgtgt	agccttgtga
13501	catttctcta	attgtattgt	tactcttgtc	ttacctccac	ataaatgaaa	atctggttca
13561	actcagggat	tgagtttatt	tgtggttcct	cagtgccttg	catacaaagg	gatgacaagt
13621	ttgtgacttg	aaaattaaat	catcattttg	ctttatacca	gtagttttta	actagtagag
13681	gttttgtgcc	ccagaaaata	taaacagtct	ccaatttgtg	atgattcagc	ttacaatttt
13741	tcttttcgac	tttacaatgg	gtttactgaa	caattggtaa	gtccagtaca	atcggggcta
13801	atgatggtta	tgattccagc	ttacagtggg	cttatcagga	tgcaattcta	tggtacatca
13861	atgagcatct	gtatttggca	aaaaatgtct	ggagacattt	ttaattgtga	caaccttggg
13921	ggggtacttg	aaggtaaagg	ccgaggatgc	agctaaacat	tcttcaatgc	ccaggacagc
13981	ccaaccccag	ctcccatccc	acaaataatt	atctgacagc	ccaaaatgtc	aagagtttga
14041	gaaaccctga	tccagggcag	tgggttttcag	cttgctttta	gcatgggagg	ctttttcaaa
14101	tgaaatctta	gttagaattc	caacatataa	acttgatttt	taaaaagcag	aactgctctg
14161	gttgaattgg	gagtgcagga	cccagaacca	ccatcggctc	aatgccctct	accctctgtc
14221	caggaacctt	ttggctccat	acatcactgc	ttaaaaagca	tctgcttctc	aagttagaga
14281	aacctcttgg	attatagggg	agtaatgaag	cccaagcggg	aaagagactc	aagtagggcc
14341	acacgacgat	ggatcctgtc	tctcctctat	aagtgaatgg	actttgattt	aggcaagaaa
14401	ataaaaacca	ttacagccct	tctgctgccc	aaactataat	caacttagaa	aagctttggg
14461	ctctgggcca	gatgtggtgg	ctcacgcctg	taatcccaac	attttgggag	gctaaagcag
14521	gcagatcact	tgagctcagg	agttcaccag	cctgggcaat	atggtaaaat	ctcatctcta
14581	caaaaaaaaa	aaaaaattag	ccaagtgtgg	ttgtgtgcac	ctgtagcccc	agctactcgg
14641	gaggctggga	cagcaggatt	gctcaagccc	aggaggtcga	ggttgcaagc	agccatgatt
14701	atgccactgt	actccagtcc	aggcaacaga	gcaagatgct	gtagcaaaac	aaacaaaaca
14761	aaagtagaag	cagcttccag	ctctgtagt	tcaacagtgg	gcagagaatg	gtccagccag
14821	cgggaaggcca	taaggatgcc	aggctgggtg	ctccttaagg	gcagggcccc	cgtcaccttc
14881	atattcccca	tggtcctggg	aagccacagg	tgcttagtgt	ttactaacat	gagaaaagga
14941	cagcaaccat	aaaggggtgca	gtgggttaaat	ttcagaccga	ccccacacaa	agctccact
15001	gccagggttt	ggtaaagtta	gtgtcgcaga	agatacaaaa	aagcatttcg	ataaaacctg
15061	aactgccaga	cttaggagta	gatgaggtgg	caccacacca	cccccaacct	gcctctcccc
15121	aggcccccg	tatgagaatg	ggacttagag	gagttcagag	acatgcctca	agtcacgtga
15181	cttctaagtg	gcagatcaga	ttcagggaca	tctgaattca	taacgggttt	tagggaaggc
15241	aagactggca	gcctgagaga	catagggagg	gcaactgtgt	cgttctccct	gcagaggggg
15301	gtcttgagta	acttcttgtg	agaggaggtc	aagaaaaccc	acaagaatgc	aggggagctg
15361	ggccaggcag	agcacgggtg	gaacctatcc	tcgcttcagc	ctgacctcct	cagagcacat
15421	tttctgagcc	agatctgcgg	tctttgataa	gctgcccagt	gtatctgaac	tggtgcagc
15481	cgcggctcca	tccagcgaga	ggccctggca	gccttccttg	gctgtcgtc	tctcggccgg
15541	gcctggaact	agccaagatt	cgcgatttcc	acccaggat	ccgaggtctt	gcagaaacta
15601	aggctcacaa	ggccaggcct	gagccaccga	ccaaggggaa	ggacacagag	actgccttcc
15661	tcctgcagga	ggtggataat	atagagcgtg	ccctggggga	ggtggggtag	atagagcccc
15721	agcagggaag	ttaggaaacc	tgctctccaa	ggctgtgtgg	tcctggacaa	gtgactttcc
15781	ctctctgagc	cttcatgtct	tcactctgtac	aatcagggca	gaggctagag	cttgctctag
15841	attgtgactg	gaagtctgtg	ttaccaagct	cccctggcac	aatcattcat	ctaaacaaac
15901	ctgtggagtt	taaagaactg	gattcttttg	cagctgctgt	gctgctcaca	actcactgat
15961	gctgggtccc	ctctcccagt	ccccttccag	ctcctgggct	cctgtgttcc	tcccacctg
16021	tgctccagag	cgcctctgtt	taccgcgccc	tttctcaatc	acatgcccc	gtccctctct
16081	tcctgcaagt	tttcccagga	agccaaactc	tggagcagta	gtactaaaga	ccccagaact
16141	tttccaggca	tgtcttccat	agtctccctc	ctccacggac	cccatgctcc	ttctccatt
16201	caccacaggaa	gattcaccct	gccccacca	cgcagcttcc	ctcagacctc	cagctctatg
16261	ctgatgctgc	ttacagccaa	cacagttgca	gcctcttggg	tcttgggtgac	tggtgcagc
16321	ttctctgctt	tgtccccaac	acttggcctc	ccagttccct	tctgtccttg	gtcactctgt
16381	ttcctcttaa	gccactctat	tgctgggtct	tctcatacat	cacacacact	tgtcccagct
16441	ccaatagtca	catcctgtga	ttcctccctc	cccactttct	ctggctaccc	acaccctgcc

16501	agggccttga	gacttagaac	atagaaatta	aaagaattta	attccaatga	actcaaaatc
16561	cctgaagctg	aaaccagagc	attctttgtt	gcttgagaaa	gggtagagga	gtttagggaa
16621	gagagaacta	aacctacgaa	agacagtcac	ctttttccac	atctcgtccc	tcttgctgtt
16681	gaagtcgcct	gtgcctggga	tgtccaccag	cacgacccct	tctgggatca	ggtcggattt
16741	gggaagtgtc	acttccacat	gtttgatcaa	gggccagatg	cgcattctcag	cggcctctcc
16801	atcccaatct	ctcctctgtg	tgcggatgta	gggggtccagc	ttgatggaca	gctcttctgc
16861	ctgaagaagg	aggacagagt	cacacacacc	agccatgcac	ccagctctgt	tcaccccggt
16921	tggctgtgat	gcaggttcat	ggtaagtatg	ctgagtaagg	gtaagaagtg	cgtccaacag
16981	gaggcctgca	atcaggtctg	taggacctag	aacctgagag	ccaggaagga	ccctggagag
17041	gagcaagttc	aagatcctta	ccttacagat	gaaacaaaac	caatgtcagc	taaaatggga
17101	cttttagggaa	gttatagtat	tgctgaataa	taagtttatc	ttctaaactg	cattcagttc
17161	taaaattaac	atactatgta	attgaYatth	tcattaccag	aaagctagca	atgactatag
17221	aaaattaaca	gtgatatggg	aaccatatth	tccaaactga	aaattgatct	gaaattggat
17281	cttttttttt	tttttttttt	tttttttgag	acagagtctt	gctctgttgc	ccagRctgga
17341	gtgcagtggg	gcgatctcgg	ctcactacaa	gctccgcctc	ccgggttcac	gccattctcc
17401	tgccctgactc	cccaggagct	gggactacag	gcacccgcaa	ccacgcccgg	ctaatttttg
17461	ttgtattttt	agtagagaca	gggtttcacc	atgttagcca	ggatgggggc	gatctcctga
17521	cgttgatgatc	cgcctcctc	agcctcccaa	agtgtctggga	ttacaggcgt	gagccaccgc
17581	gcctggccga	aattggatct	taaaaagagt	ttttaaaatt	tatcttctga	ttacaaaaaa
17641	taccttgata	tgtaggcatt	tctagaatat	tttaatgatg	gtgggtgaga	gagggaatag
17701	ttcttagacc	acggttccta	cttaaacatg	tctcgggaca	atgacacatc	catgccagca
17761	actatgacag	taaatcgcaa	ctgggggtact	tcagaggaca	ggggatttgg	gatgtatggg
17821	ggctactgtt	aaataaattt	ctataaaaata	gtcctgaaag	aaagataaga	atgtcagttc
17881	ttaagagagt	ttaaattaaa	tcgctggatt	tggttgcaatc	tggggaagga	gtaagagatt
17941	tcattcaattt	caaccaaatg	ataaaccacg	acggaggaga	taataaaaagc	tctttaagac
18001	attgtaattt	taaaatagag	cagataaccgt	aagagagaag	cccaggaaaa	ggcaggggct
18061	tgaaaagccc	cttcctacaa	gagggctcag	ccaataaac	tggttccggg	caaacatcgt
18121	tgtagaaggc	cttgattcta	ggatctccag	tggaaaccct	gaatttgtaa	gccactcat
18181	cgagatggta	attctgttca	ccttggtttcc	gtgcgtaaat	ttatgacgct	gggaaggagt
18241	atttctaaat	atagagttgg	caaagacgtt	gatacccttg	tgtaagttgc	gtgtattcag
18301	ataaagcaac	tagttttgta	atcattgtgt	ttcttagaca	tgctcagtct	atgttttaga
18361	tattagaagt	gtaatcattt	taatagtaat	attcgtctta	aaactgtaag	aaatgggcac
18421	tgtatttggt	tgattttcca	ggtatgcaag	agatagtaac	atgctttgaa	aaggtttcat
18481	tcatttgatt	tttaagtgtg	cctagtcaag	catttaaaaca	ttttaagagg	ctcaagtata
18541	ttgaacttta	actgtaatgc	aaaaagccta	aggaaatgtg	attaattatg	taagtatcat
18601	taatatTTaa	ggaagatttg	ctttgttaat	caggagatca	ttgaacattt	aacttttaga
18661	catgtataaa	aattgtaccc	atTTTaccaa	taatcactag	atTTataaat	agaatagcaa
18721	tattTTaaag	gtgtattTTaa	aggtgagaga	tacaagaaaa	actaggTTTT	taaatgtata
18781	gctTTcctaa	attgaaatgtt	gattccacaa	atattTTgtt	TTaattcaga	aattgaattt
18841	taactTTaaa	taaacattgt	TTataaaaagc	aagaatatca	TTctactagt	Tgcctatcga
18901	atgtccatcc	Tgtccctctt	TTatgccagc	agaatcctga	TTTTctgtct	gactggggag
18961	gcagtggagt	gaaactgggc	taagcaaatc	atgacaagtc	TgctTTTcac	TTTTctctgga
19021	ctccctTTca	gccaggaagg	gctgtgtggc	tcagtTctga	actctgaaat	ctacacagaa
19081	atttgtcaga	ggatTTTctg	ggaaagTTTT	tactTTTctga	Tgaaagggga	gatgtggctg
19141	atgccaacct	TTTTctccact	TctTcctTcc	aggaggctag	catgaagtct	agcactccgg
19201	gagccatctc	atgacaatgg	gggcgacgga	aggcaaaggg	agccagagat	gctgatgttg
19261	gcattgctga	Tccactaaac	caacccacac	cctactgcc	ccaaacctct	tacatgagaa
19321	aaggaataaa	TccctgtTTg	TTtaagccac	tataagtctt	cttaaaaaat	ctTTggcagc
19381	ccaaactatc	cctaattatt	ctcaagcaac	Tgtaaatagt	ctTTTTctgg	gcataagagc
19441	Tcctccattc	acataccaaa	aattTccatt	Tgatagccat	aaataatgag	gataactTgg
19501	gctacggata	cttctaaatt	gggtagcaac	TtattTctta	TTTcacacaa	acactgtacc
19561	acaagcccat	cccctgaaac	aggtTcaact	gTtagacttg	agaccacagga	Tgaaatcaag
19621	gaaaaaacga	actTgacgct	acctctTccg	ccttgagggt	gatgactctg	gaggtgggga
19681	TctTcctTTt	gggctTcgcc	ctcagtaact	cctcatagtt	cttactctct	gccccatttc
19741	cataaatcat	Ttgtagcttc	caggTggctt	cctccactgc	ctcatccctg	Ttccacgcat
19801	ctgcctcttc	Tctgctcagc	Tcctccgtcc	Tatgcaggag	TTTggTcagg	TtctTcagct
19861	cctccctcca	ctcctgcca	ggcagagtag	ggccaagccc	ctcttgacac	agacacagag
19921	aacaccgaca	aacagagggg	cccatTgcc	cctgtggagg	gccagggggc	TgcataTTca
19981	gaaaatctag	gtcatctatc	TggggTctcg	aagaggggga	TggctTgccc	aaagtctcat
20041	aaaaatgcaa	ggaccaggct	agacccctc	cccagctcac	Ttgatgaact	Ttctcctggg
20101	atgggctctt	Ttcattcaac	aaaggcatga	gctgtatttg	caaggaatat	aatgttatct
20161	ctgagagaca	gtgagaagga	aagaaagaaa	aggaagaaaa	aaaggaagag	aaggaagaag
20221	gaaagaagg	agagagggag	ggaagaggaa	ggaaggaaga	aagaaaggaa	ggagggaacg
20281	aaaaagggaag	aaaggaagga	aaaagggaag	aagggaagga	aggagggagg	aagggaacac
20341	Ttacctgggc	agacagaagg	TggattTTTgg	cctcatactg	cacacagcag	ccagagctca
20401	ctTgtacaat	gcaggaagta	catatgcttt	ctccagacac	Tggtagaaac	attgctTgct
20461	ggatgatggc	attgatcagg	gagctctTcc	cagccccagt	gctTccaaat	aatgcaatgt
20521	agattgggtc	cactgtcggc	TTTTcaatca	aggcaagaag	cctattTctg	gatgaatttt
20581	aaaatgcaca	Ttgccatgat	catcaaagtt	tagagtgaag	agcattgaaa	cagaatgcaa
20641	aggaactgaa	Ttctaattcc	gggcacgtca	ctacaacctg	agtctctgtt	ctctcctctg
20701	Tcaaaggaga	atatcaatcc	ctgTTgacca	cacagagttg	gcctggggat	caaatgagat

20761	tatgtaaaaa	tatttggttaa	tgataattcc	acacaatccc	tgtaatgtct	atatagatgt
20821	gaggtgtctt	tatttggtatt	cactggaaat	tgcataattct	tttttttggt	tgtttatgtg
20881	tctgagacag	gatctcactt	tgtcacccag	gctggagtgc	agtggtgcaa	ttatggctca
20941	ctgcagcctt	aacctcctag	gctcaagcga	ctcccttgcc	tcagcctctg	aagtagctgg
21001	aactacaggc	gtgctccatg	acgcctggct	aatttttttg	tattttgtat	agagacagag
21061	ttttgccata	ttgctcaggc	tgctctcaag	tggtccaccc	gcctcggcct	cccaaagtgc
21121	tgagattata	ggtgtcagcc	actacacctg	gacagaaatt	gtatatctct	gatcctagaa
21181	atacaatgta	tacagacatg	aagtattaat	agtgttagga	gcaacacaga	gtcttactga
21241	gcaggagaaa	ttgtagcctc	agcaccactc	gagtccttca	agtcagcaga	ggacaaataa
21301	ttggggacat	gagctcagag	tcacacagcc	tgggggtgaat	tctggaccct	ctcactgact
21361	actggtgtga	gtttgttcac	atctgggcct	ctctgagcct	caatttctagt	aaaatggaag
21421	tgatcataat	agctcctact	ttataggagt	gttggtatggg	ttaaatgata	tttgacatat
21481	ataaagcact	tagcagatta	cctaacagtg	acagctcaat	gaatggcaac	tatcccatag
21541	ctacagaaat	ttgtgtccct	cttttcttag	tttctaatta	aatagtccct	ttccttggtg
21601	ggggaaagca	cctataatcg	cctaaggaaa	gacactgaca	taaaatttca	gggttgcaga
21661	tttcagactc	acatgagata	cttgactcca	ttagggatgc	tgtcatccag	gaagacagac
21721	tgaataagtt	tctgataagt	gttgctcaaa	acccttcttg	tccgtgattc	caatttttca
21781	tctggaatta	acagagagat	gtcacctgca	ggtacctggc	agggataaag	tactaggtct
21841	ccaaaggagg	tgtctgttga	acatcgcaga	gaagggaaaa	aaaaaatgaa	atgaaaagcc
21901	gattaaacaa	gatagcaggt	tatctcacac	gagggatggc	ggctcactgg	agatagcaat
21961	cattgggttct	gaaaatctcc	aaagagccag	gctgctctga	aactctggta	acagaagtta
22021	tggtatgctt	ggccacgggc	ttcagccctt	tctagatttt	tccctcctgt	ggtcataaaa
22081	agaaagaaaa	aatgcaagga	caccatgctg	acaccacgg	aagcaccaac	ctcatcattt
22141	tcacaggctt	tgttctaata	tggaagaagt	tatttttgata	acaaccctcc	tgcccacaga
22201	tgccctggaga	caaattgcct	aactgcatac	cgctacagag	actttgagcc	ctctctttcc
22261	aaaacagggt	tatttgatgt	ttcatccagc	ttcagaattt	aacctcctct	tcctttgacc
22321	attttaacat	acttgaaca	gaaccgaacc	atgttaaaac	aacagttcca	agacactcac
22381	attccttaag	agcactctgc	tccatggagg	gaaatgctcg	gaaccgctgg	tctcgatctg
22441	atttccttct	ttttctcggt	cgttctttat	ataaatcatc	ttcaactaga	gataaacaga
22501	ggatatataa	gattataggt	gttgggggtat	ggtattcttg	cctcacctct	atcagcatag
22561	aaactcaaag	ggtctaacag	actggctggg	tgcagtggct	catgtctgta	atctgaagca
22621	tgagggatta	catgcctggg	aggccaaggt	gggaggattg	cttgaggtca	ggagtctcag
22681	acatgcctgg	gcaacacagc	aagacccttg	tctcaaaaaa	aaattttttt	ttttggtaga
22741	gacaggggtc	ttactgtgtt	gccagcagg	ccagagtgtc	gcggcatgat	cacgactcac
22801	tgcaacctca	acctcccagg	ctcatgtgat	cctcccacct	cagcctctag	agtacctggg
22861	actacaggca	cacaccatca	cacctggcaa	atttttgtag	agacagtgtt	tctgtatgtt
22921	gcccaggctg	gtctcgaact	tacaaaaaat	atatatatat	atattttttg	attagccagg
22981	tgtggtggtg	tgacactgta	gtcctagcta	ctcaggaggc	tgaagtggga	gggtcacttg
23041	agcccaggag	ttgtaggctg	cagtgggcta	tgatttttgc	actgcactcc	aacctgggtc
23101	atacaagacc	ctgtctcaaa	aaataaaaaa	ataaaaaaat	aggaaactgt	tccagctctg
23161	tctgcccata	aactcatttg	ggaaaaaaca	ctgttggatc	attccagttt	ggttcctact
23221	tctcagagtc	acaagactgt	ctgcatttag	ttccaaaaatg	tagagttcaa	tctatctccc
23281	cagataaata	gtttctattt	gcaactcctc	agaagccaaa	gtggctggac	attcttcacc
23341	aaatgccaag	tcttaggaaa	tcaaccaact	gtgtagagaa	aagctgaaga	cggggttaag
23401	tgtgcagtga	ggaaaggcct	ctgggaggtc	tttccagact	aggaaagaaa	gcgactagaa
23461	gcagaatgca	aaggaaaaca	ggggccaggt	gaccagaaaa	aatcacatct	tcttgagcct
23521	caatttatct	atctggaaaa	tgagagaact	gacaaaaaaa	atacacatgc	attacaagag
23581	tttggtatgga	tgcccttcag	agatccttca	aaatttgggg	aaattttttc	ccttcttcac
23641	ttggagacat	cagcagttgc	ttccttgcac	aataagcaag	aacagaaatc	acctagaagc
23701	agatctttgt	agctctgcgg	agattcattc	acttaagcag	tttcccttgg	ttatgaagtg
23761	aagggtctgt	tgggcccata	atcctaaaga	aggggtataa	ccaaaatgtt	gtgttttaga
23821	tggatttttag	aaaacacccc	ctggtcatgt	ttacctggct	agaaaggggc	aagaggtgga
23881	tctttgggggt	gaagggtgtt	gaaaatgggt	ctaaccacag	gctcctgggg	ctggcctgca
23941	ccttagaaaa	tggccatgag	gtgaaccaa	agagtagatc	cccaagaatc	acagggaggc
24001	catgaggctc	caaaactgag	tgtgacattc	tgaggtcatt	ccctgcagaa	tcacagagaa
24061	gaaatgtcac	gtggcatcca	agaacggcag	cccacacaga	aggcccagtc	tctgcctgag
24121	ggctccagac	acagatctcc	cagacaattc	aggcagccct	ccctctctgt	tcaaccttgc
24181	atcttccagt	agaaatggaa	gccaacgcac	accccgtaga	atattctagt	gcaagccatg
24241	ctatttgcca	aggcctgaat	ctctgccacc	tcatgctcca	cgctcaagcc	acaactgaga
24301	gttgagagag	gttatacttc	gaccttccc	tctcagacat	tctaactgat	gattgagctc
24361	aaattcaaga	attcgccctg	gctcggtttg	aggactgcct	tagaactaaa	taccaagtgg
24421	ttgctggcct	ggtggctgga	gctggagagg	aagaggcaaa	gaaagaagtc	tgctggctcag
24481	gcccctaggg	cagctaccgg	ctgaagaaca	ctttaatctg	tgctcgaaaa	agcatctcag
24541	aactccagga	tgtgtccaca	acctgtctgt	ggaaagagtg	gaaagggatg	tagactttgt
24601	aactcaggaa	ctcttttggg	taaacaatgt	ttgcctaata	tcttagccat	gtgtataaaa
24661	caagggccaa	gtccacacat	ccagggccct	tatttcaaca	ttgtaaggac	tggcaacgaa
24721	tctgataaga	gtttggaagc	ttatttctca	actaaagcaa	atgctaggaa	gtccaatata
24781	gcagggttta	aaactttttc	ttcaatttct	aaaatgcaaa	actatctgga	aaggagaaag
24841	tattccatct	tggattttata	ccatacagag	gtagtatttt	tatattagat	tgtaacccaa
24901	ataaacttgt	ccgaattttg	atcacagatc	ttattattct	tgtccatcgc	tcaagccctt
24961	ccttgccctt	tccagcatct	tccaccgaga	aaccagctgt	tgggggtggat	agcggcagtc


```

25021 caaaaagcSt agtatactgc tgctgttcct tcttgctgcc acaaggtgtc agttttgaaa
25081 actgatcccc caacagcctg agctgagatg Yggtttcatt gttgactgtt gaaatttttt
25141 tttttttttt gagacgaggt ctccactctc gcccaggctg gagtgcattg gctgggtcac
25201 ggctcactgc agcctcaacc tccgtggctc aagcaatcct ccgacctcag ctcccaagta
25261 gctggaacta caggcactca ccaccacgcc tggctaattt ttttttcttt tttttttttt
25321 ttccagtgat gaggtcttgc tgtgttgctt aggctgggtc tgaactcctg ggctcaagag
25381 atcctcctgc ctggcctcc caaagtcctg ggattacaga catgattcag accattgcca
25441 gaaactgcca gaaatcttcc aagcaaaacg atcccattcc tctaggctaa gctcaactga
25501 ggtgacccca aagtggcagc tcttcctata tgctgtctca ggcttgcttc agatgctagc
25561 atcaccccca ctaaccagaa aacactgctg cactttgccc ctaaggaaat ccatcccttc
25621 ggagttagga aacattccct cttcagttct caaaacacaa aggatatgat acgccactgt
25681 tttctgcaac tgggggttat atccctgtca tcgtcctata gggaagcctc ccttattggc
25741 tccaggggag caataccagc ctctgtgagg agggaagcca ccgcactga ctccaatgtg
25801 agtcaccctt ccaggagccg ctccaaggca cctacatctc tcttctacg gaaagccgcc
25861 taacgtcatt ccagggtctt tgtaagacag gctacctgac ttggacagag agtccaagct
25921 gactttctgg aacattatta ttattgagat ggagtctcac tctgtcgccc aggctggaga
25981 gcagtggcac aatcttggct cactgtgacc tccgcctcct gggttcaagt gattctcctg
26041 cctcagcctc ccaagtatct gggactacag gcacacacca ccacaccggg ctaatttttg
26101 tatttttagt agagatggga tttcaccatg ttggtcaggc tggtcacgaa ctctgacgt
26161 catgtgatcc accgcctca gcctcccaa ttgctgggat tacagggtgt agccaccatg
26221 cccagcctgg aacttttttt ttttttttta aggaaaagc cgcacttatt taactgctgg
26281 ccaaacagtt cacttcatta tgaacaggtt atttcagtta ctggtgaaat atctgatctt
26341 cattcactat ttaaaactgt cacgagaaag caccttctga ataaagagta aggaacaatg
26401 acaacagtga aatatagtcc caacctatct gccttttatc ctatatcagt aatcagttcc
26461 tatatcctcc atcagaagat actgcaaaga tgttacctgg atgcggttcc tggccaaaaa
26521 catccttcgt ttctgccatt ccttggtacg tgaactcctg ctcttctcag ttcaggagaa
26581 ccagcctgtg aagacaaagt acaaagacag gtggggcagc ggaatttgaa aatacagaaa
26641 gcaaacccta aggatgtgtc agtctgcttg tgcggtatct ctgccattc caacgtatct
26701 ctgaatccct cacaacacct agtacactac ttgatggaaa tataacaaag attagtgttt
26761 gaacactggg ttccaataat acttaggcca ggcgagtggt ctcagcctg taatcccagc
26821 tctttgggag gccaaaggcg gaggatcact tgaggtcagg agttcaagac cagcctgacc
26881 aacatgggtg aatgccgtct ctaccaaaaa tacaaaaatt agccaggcgt ggtggtgggt
26941 gcccataatc ccagctactg gggaggctga ggcaggagaa tctcttgaa ctgggaggcg
27001 gggctttagt tgagccgaga tggaaccact gcactccagc ctggatgaca aagcgagact
27061 ctgtcttgag aaaaaaaaaa agtctaaacc agtattacct gagagcttta gggtaactca
27121 cgctgaaatg agaataagcc tctggtgacc agagctgtga aggtgaattt atatagcttc
27181 gctgcttttg gtggcatcag tgctccactg gggcaaggct tgaaccctga gccagtgcta
27241 tttagttcca gaaagtctca gcaggaatct gggaggtgga acattagata ttcctagagt
27301 tccctggagt tgctttgggg ggctgctgac tggggaagga gatgcagtga ctgggttccc
27361 tggaccttcc tcaccaagcg caacttcac caggaggaca cccctcctgg gctctccttg
27421 cagcttgtag catggagcat ctgcaggagg gagaggagag gcacatccaa aagaagaagg
27481 ggcagatcca gttggtctcc agtccaccag cagatagggc ttggacatag agggagaact
27541 ggacctggtg aggtcagaa cagagggcac tgcccagaca gggtagaatc tgctagcctg
27601 gagctgcttc atctccaccc atagagaaga atttgaggaa cacgagtggg gaacacccaa
27661 ggtgcttact tgccgttacc tgatgtttct gtttgatca ctcagccgtg tatttcaaaa
27721 gcagagtcac cagcccttct gaaatatgca aaatcacctt tgatctgtcc tactagacct
27781 acaggctgtt atttagggaa actatgtctc atttacacat taaccccaaa ttaaaatcac
27841 cattcatcag ttactcttag tttggtttgc agatattaac tgactaaacg gcttctgtat
27901 ttgggtgggt ttgggtgaat ggggtgagaa cccctattaa gtgcaagatt ctgagtctta
27961 ggtagagctc tttccctctc ccttcctccc ctctgcagcc cattttcaga tcatcccaca
28021 ctctttacag ttctccaaag cagggtatcc tattgaactg ctgagcattt tagcacatgt
28081 ggggtgccct tcccttcttc tcgcagggtg attcctgctc ttgcttcaaa atcctgttct
28141 agtgtttcct ctgtgaaacg gtgtctgatt cccactcatt ccccccgtgt gtccccggct
28201 ccatacacac ctgtgttata acactgactg tgctgtgctt acgtctgttc ctctgggttg
28261 aaccactcga ggtcagagga ctgcattttt ttcagtgggt catttctatc aagaagggca
28321 atgactaact aaacgttagc tgaatgaatg gataacataa tggatgggaa gcttttgatg
28381 agattccaca ccaaaggatg tttaaaagct aaatttggtg ttttgggtct gtggtttggt
28441 tgcttgtgac agagtcttgc tctgttgccc aggttggaat gcagcggcac aatctcagtt
28501 tactacaacc tccacctcct gggttcaagc gattttcctg cctcagcctc cagagtagct
28561 gggattacag gcattgcacc atcatgcctg gctaattaca attttagtag agatggggtt
28621 tcaccatggt ggccaggctg gtcttgaact cctggactca agtgatccac ccacttcagc
28681 ctcccaaagg gctgggggtta cagggtgtgag ccaccatgcc tggccctgaa ttcatttttg
28741 gtatgttaga gtcccttgatt gaagagtaaa gcaaagagta gaaataaata gtcaagtatg
28801 caaatgaagc Rgcactcaca gtgaggactg ctccacgggg atgaggaata tttgatgtga
28861 ggWagggag acacaggtaa aggcagaaga tgggggcagg ggccttcatt gtggtcttca
28921 aatgcattac ctacagctg caaataaaag agacatcctg catattttct agggttccca
28981 gagggtagaa atagatccac taggtggcag gtacaagaaa gcattttggt ttaacattct
29041 caactaatca gagttgtcca aaatggaatg agctccctta ggaaaccgtg agttttctgc
29101 ctctagaggt gtctgaacct atattgatat gaccacctaa taacgacatt gagatagata
29161 aatttttaag cttcttcaaa tcccaagatt ctatgttctt acttgaaatt ttcaccaaga
29221 aagctggtag tagaagtgcc ctatgaggtc accaaatttc acaagaggca caagcaattt

```

29281	ctgggtttgga	atactgagtc	agaaatgctg	acacacatca	aaacctaggt	gagctacaag
29341	aaaaaaaaag	gtagatgggc	tataacatga	gtaaatatac	cataatgcat	gtcaataatt
29401	ttaggcaggg	tgtgatggct	catactctata	atcccagcac	tttgggaggg	tgaggaggga
29461	ggattcattg	agccctggag	tttgagacca	gcctgggcaa	tcaagtgaga	ccttgacact
29521	accaaaaaaa	aaaaaaaaga	aagaaagtag	cgggttgttg	tgacacacac	ctgtagtacc
29581	cactattttg	gaggctaaga	tgggaggatc	ccttgaaccc	tggagttcaa	ggttgcagtg
29641	agctatgatt	gcaccactgc	actccagcct	gggtgacagc	aagaccctgt	ctcaaagaaa
29701	aaaaaaaaatt	agatacagaa	ctaggattac	ccctaggaaa	aagatctgtt	gttttctgaa
29761	gagagcagct	taaggagtaa	ctcgtatgaa	atgctaggca	tcatattatc	acagtgagca
29821	ctggaagcaa	aacaaaatgt	atgatacaac	cagtgaacaa	atccatgggtc	gacctccagg
29881	acagctgggtg	tgctggaatt	caaattctag	gaggaaacag	tggagccgga	taaagtacaa
29941	aagaactgat	agaccaagtt	gataagagtc	gtggtcatac	agacactaag	attagggacc
30001	ttcaattgag	agagctgtgg	attaaagggc	acaaaatcaa	agggccttga	gttttagagca
30061	gaagcagctg	tggtcactga	attctggaat	acgggtagta	gttttggcctt	ctttcagaat
30121	cacaagaact	ttagttcatt	tgacttcatt	tactaaatca	acagtacaca	gtgtccagca
30181	agggccgtta	gcatgtaact	agctgggggtt	ggtttggggtt	tagctgcatg	caatgaagac
30241	agaaaaccac	acaacttcct	ccgtagcagc	atctatgggtt	tctgtataca	agtaatttgt
30301	gaactctaac	tgaaatttgg	aatcattgga	aattatgttg	tttgggtgtg	gtggattggg
30361	cttcaaattc	ctttggccaa	tgttcaaaga	ctggcaggaa	gggatcattt	gatgaccaa
30421	caaaaacact	agcaaattgga	aagggatcat	ttgcaaaaag	gctaagagga	cagaagaaaa
30481	taaacaccaa	gtacataaaa	aggaagagcg	ataaacaat	gggggtagtt	tggtacagac
30541	attcagtata	tagtcatttg	gttgaactaa	atgatgaggt	gggaagaaca	ttaggctgga
30601	aatctgggtg	ggaagcttcc	agctccagct	ttaccacca	tcaataaagc	tggaggactt
30661	aagacaagtc	gttttatcac	cctggcctca	ggtttcccat	gtgtaaggca	aagactgaac
30721	tagtccttaa	agtgtgagtg	ttctctgatt	tagatgggtg	ctaaaaagac	acaaattctc
30781	attttgaaaa	tgtcacctgt	cattgaaaMt	gagaccgtac	caatgattag	ggcttccgtg
30841	tggccaagag	cagtacacca	agagcactgt	gatttcaagt	gcattgtatt	aaggagaaaa
30901	tgagctacag	gagtatagtc	cttcttcaaa	tcatcctgca	gtctatttcc	ccccaaagg
30961	aaggaatggt	ggtgttcatt	gtgaaaattt	ggtttctgtg	gagaagcaat	tgataacagt
31021	ccaaatttat	tgctcagata	agcaaggctc	tgctgtgtg	gtttattttg	cttgtatttc
31081	agctatgtgg	ttagcactga	agttttgctt	ttagtgctta	tttacattca	tgtgcaactga
31141	acctaagaat	agcatctttt	aaataagact	gtgcacattc	agctagatat	aggaaggctg
31201	cacagaactg	atttcctgat	aaataattgt	aacttttcac	agttattctt	gcttctctcc
31261	ccctcctttt	cttctgtttg	tgtttgctta	ttgttttttt	tcttacagga	aatcacaga
31321	ggcaacacaa	acgcaggtca	ttcctgtact	agaacagctg	catatcatgg	cattgaataa
31381	agaatgcggg	ccgggtgctg	tggctctcgc	ctgtaatccc	agcacttttg	gaggctgaag
31441	caggtggatc	acaaggctag	gagtttgaga	ccagcctgac	cagcatgggtg	aaaccccatc
31501	tctactaaaa	atacaaaaat	tagcccgggtg	tgggtggcacg	cgctgtaat	cccagctact
31561	caggaggctg	atgcaggaga	attgcttgaa	cccagggaagt	ggagggtgca	gtgagccgag
31621	atcacgccac	tgccagcctg	ggcaacaaag	cgagatttcg	tcttaaaaaa	agaatgcta
31681	gggcccttcc	ttctacagat	ccagaccctg	aggaccagga	aggggaagaa	acttgtccaa
31741	ggtcacatag	taagattatg	gcaatgaggg	ctgaaactca	gttttcctga	ctccaagttc
31801	aatgttcttt	tcatcacatt	cagcagcctc	taataggcac	tatttaaaca	agccccctgg
31861	agctcaggca	tagggcaatg	gaaggagtag	tgcccgc aaa	ggagggttcc	ctcaaattgca
31921	tggcaaaggc	atttcatgag	aaggaaggct	gttgagtggg	gagagagagt	agcaacttga
31981	tagaattgta	tgcaggaaat	gaagctgaag	ctactgcctg	caaactgctt	ttttgttttt
32041	gtttttgttg	ttctttgttt	ttttgtttgt	ttgtttgttt	gttttgagat	ggagtttttg
32101	ctctatcgcc	caggctggag	tgcagtggca	catgatctca	gctcactgca	acctccgcct
32161	cccagggttca	agcgattctc	ctgcctcagc	ctcccagagta	gctgggatta	caggcacctg
32221	ccaccatgcc	cggctaattt	ttgtatctct	agtagagaca	aggtttctact	atgttggcca
32281	ggctgggtctc	gaacccctga	cctcagggtga	tctgcctacc	ttggcctccc	aaagtgtctg
32341	gattacaggc	atgagccacc	atgcccacc	ttactgcctg	caaacttgaa	gacaccctca
32401	gaagtaaaac	aagccagaga	gagagagaga	gactatcaga	ggaatacatt	ttcactgcat
32461	tttttctgtg	ttcaatgcaa	aattcaatgt	gtttattaca	aatgacaaat	gtccttttct
32521	tttcccctag	ttattctcct	taggcagaat	ctcatttcac	cctaccttgc	ctcgcatcat
32581	taacccttgc	caacactatt	tacttactta	aatttaaattg	cttaaattag	caaagtttct
32641	caaaggggca	ttttgggtcat	taacattgggt	ttactctcta	cttttaataa	atatgggaag
32701	tacttggtac	acagcaagca	ctaaataatt	tgttgaatga	atgatgatag	atataatttt
32761	ttgtatctat	atctagatag	atctatctag	atctagatat	agatatatat	cttagatgggt
32821	aagatcaaga	atagcagaaa	ttatatattac	tattttattt	atccatccat	tcattcaaca
32881	aatatattgtg	agtgccctatg	atgcaccagg	cactgttcta	gatactgggg	gtacagcagg
32941	aaacaatgtg	gtcacagtat	ctgcaaacaa	agggcttcca	tattccagat	gtgaatgggtg
33001	gagcaaaaaat	tattagggat	ttggagtcag	aatgcctgga	tttttgctcc	tgctcccaat
33061	cttcaatgca	acacagagca	aatcacctga	tctctctgag	cctctatttc	tccacatata
33121	ggatagaatt	ggtttttaaaa	aaaataacctg	tatcaagaat	tcattggcca	ggcatgggtg
33181	ctcatgcctg	taattctagc	accttgggag	gccaagggtg	gccgatcact	tgaggtcagg
33241	agttcgagac	cagcctgggtc	aacatgggtga	aaccctgtct	ctactaaaaa	tacaaaaatt
33301	acctgggcat	ggtgcagcat	gcctgttaatt	ccagctgctt	gggagactga	ggcaggagag
33361	tcacttgaag	ccaggaaaca	gaggttgcag	tgagttgaga	tcgcaccact	gcactccagc
33421	ctggggcaaca	gagcgagact	ccacgtcaaa	aaaataaaaa	ataaaaaaga	gttcgttgtg
33481	agaattaaat	gtgataatga	atgcaaaaatt	gctctgcagg	cacttatgca	tctgtacaaa

33541	tgttatTTTT	tgaatatTTTT	atgaaggtag	ttaaactaga	aatcagtact	agtgtcatcc
33601	aggccacgtc	tgtagtctt	tggggaacag	atgccacctt	agctgagatt	ctgactcccg
33661	ttcttgtccc	tattgatcaa	acacattgag	gatgctctac	catcttcctt	aaagaatctt
33721	cgatcagctg	ggtgcagtgg	atcacacctg	taatcccaac	atTTTgggag	gctgagccgg
33781	gcagatcatg	aggtcaggag	tttgagacca	tcctggctaa	ctcgggtgaaa	ctctgtctct
33841	actaaaaata	caaaaaatta	gccagccgtt	gtggcacatg	cctgtagtcc	cagctactca
33901	ggaggctaag	gcagaggaat	cgcttgaacc	cgggaggcgg	aggttgcagt	gagctgagat
33961	catgccactg	cactccagcc	tgggcaacag	agtgagactc	catctcaaaa	aaaaaaaaaa
34021	caatcttttg	tcaagttttt	tcttgctctc	acaagaagg	gagctgaaga	atgaaagaag
34081	gaagaggagg	agactgttaa	tgaaatgata	gaatgttgat	gaaatttaga	atttatttcc
34141	tttctctttg	agtttgggtt	taggttttaag	taactttggt	gttggcaaca	tttcctaacc
34201	acctcgtttg	ccactgcact	gctcttccaa	actagggatg	tcccaaggca	gcaattttaa
34261	cacattagct	cagaagcaaa	agtgaacaa	gggcctccaa	atctctaag	gaaaagaggt
34321	atgtttttcag	cattaacaca	tcggctaata	tggtcagaat	tagaaatgtg	gccaccagaa
34381	gcagtcgtag	tagaaggagg	gcttttaggat	gacatgtttt	tctccatctt	tcttccctag
34441	gtaaagagg	aagcaaaata	agcagatatt	ttcataacgt	acttttagcag	attctagcga
34501	aacgaatttg	aatcttctca	tattgctctc	ccaagcttgt	taaagctaata	gaggcataag
34561	atgacacttc	cctccttata	aggaattcat	acacctgcc	gcaatttctg	caatagctgt
34621	tttctttttg	gaggaatgat	taatgacttg	cctaagatca	cactgttctg	taaaattcaa
34681	actaaaacct	gattctcccc	atttctagcc	cactggcctt	tttacaatagc	cttaaaattc
34741	acttaaacag	cctgagcatg	gtggctcatg	cctgtaatcc	cagcactttg	ggaggctgag
34801	aggagagggg	atcccttggg	cccaggagct	tgagaccagc	cttggcaaca	aagtgagacc
34861	ctcatctcta	caattttttt	tttaattagc	tgggcatggc	agcatgtatc	tgtagtccca
34921	gttatctcagg	aggctgaggc	aggaggatta	cttgagocca	gaagggtgaag	attacagtga
34981	gccatgttca	taccactgca	ctccagcctg	ggtaacagac	cgaagcctca	aaaacaaaca
35041	aaccaaaccc	ccaaaattca	cttaagcaaa	cagaaaagta	aaattcactt	tccctcaaga
35101	aataacttgc	tttaagaaaa	tcaaaggaga	gagaagagac	aatgtccca	tatacagaag
35161	aattccaaat	aatttacgta	gctactccat	cctcaaggag	gtagaataaa	actccctgct
35221	ccttaagtgt	gtgctgtgca	tagcagcttc	tttccaaaga	gaacacggcg	gagattggag
35281	cagggaagg	atcaccttat	agcagagaaa	ccagacaagc	gctgcctcta	ccagggtggc
35341	aagggtcaaca	ccaacagtcc	taaatcatgt	tgacaatat	atcccttgat	atgatgtgat
35401	gagaacagca	ctttaactct	gggactcctt	ccccaaaacc	cataactcca	gtctaataat
35461	gagaaaaaca	tcagacaaat	gccaatagga	gaagcctaca	aaatacccaa	ccagtactcc
35521	tcaaaactgc	catattcatc	aaaaacaagg	aaagtctgag	aaacaacgct	acagctaaga
35581	ggagcctaag	ggaacataac	taaatataat	gtgctatcct	gataggatgc	cacagtagaa
35641	agcagacgtt	agataaaaa	caagaatctg	aatcaagcac	agactttagt	ttaagaataa
35701	cgtatcagta	tcggttcata	agttgttaaca	aatgtaccac	actaatacaa	gataatgggg
35761	aagttgggtg	ggaattacat	gggaatgctc	taaactatct	tctcaatatt	cctgtaaaact
35821	caaaactgtt	ctaaaaatta	agggtccattt	ttaaaaaatc	aaccacaagt	tacagtacaa
35881	attacataaa	agaaacaact	taccagatgt	cactgaacag	aaaaaaaaaa	aaaaagtctt
35941	ggtttggtta	caggagtcca	cagaggagat	ggtggcagct	tctccttggt	tcagggtattt
36001	ggaaccagct	gggttacgta	gccctttggg	ccacaatcac	aaagccacgt	ttacacagca
36061	gaagtgaaac	caacttgcca	tcaggagact	atttaccatg	gtctcctccc	acagatactg
36121	atttattctg	tcttctttca	cttaaatcta	aattcaccag	gcacgggtggc	tcactcctgt
36181	aatcccagca	ctttggggagg	ctgaggcagg	cagatcactt	gaggtcagga	gtacaacagc
36241	agcctggcca	acatggtgaa	accttgactc	tactaaaaat	acaaaaaaaa	aaaaaaaaatc
36301	agccaggcgt	ggtggcagaa	ccctgtagtc	ccagctactc	aggaggctga	agcaagagaa
36361	tcacttgagc	ctgggaggtg	gaggttgagc	tgagccaaga	tcgcgccact	gcactccaac
36421	ctggatgatg	gagcaagact	acatctcgaa	aaaaaaaaaa	atctaaatgg	tacatgaaac
36481	ggggatcttg	cacccttctc	tgccatgttc	ctacaagtag	acagatgtct	tttttccttt
36541	ccaagtgcac	cactgcaccc	ttccacagca	tcttttctct	gaggggtgaac	aatattcaga
36601	tgactgggtc	actgggagcag	acaggaaaaa	tgccccagtt	ccaagacaga	caaagcactg
36661	gctccccgac	acccaactat	aagacatgac	tgggagagat	ggaggatatg	agataataaa
36721	tataaagtta	ttcttgaccc	aaagtcttaa	aattcaccaa	aaataacatt	tgccaaaaat
36781	aaaacaacat	tggattgttt	gagtgtagaa	atgagtgata	taccgcttta	cacctcttct
36841	tggaaactta	atttttaaata	cgtatatatt	tatgtcttta	tttagttaga	gacaagggtct
36901	tgctctgtca	cccagcctgg	agtgcagtgg	cgtgatcata	gctcacagca	gcctcgacct
36961	cccaggctca	agccatcctc	ccacctcagc	ctcctgggta	gctgggacca	tggtcatgct
37021	ccatcacgcc	catctaattt	taaattcata	tttttaataa	accagaaaaa	caaaaatttg
37081	aaagtgtctg	ccaggagaga	agaaaataaa	accactcca	ctttgctgtg	tctggcaacc
37141	caaaccatca	catcacatac	agggaataag	ttgtcccttg	aacctcagc	ttcagggtgt
37201	gtgttacctt	tttttttttt	ttgtgagaca	cagtcttgct	ctgtcaccac	ggctagagtg
37261	cagtggcgcc	gtctcagctc	actgcaacct	ccgtcttccg	ggttcaagag	attttcctgc
37321	ctcagcctcc	tgagtagctg	ggactacagg	ggtgcgtcac	catgcctgac	tttttttttt
37381	tttaatttta	gtagagacag	ggtttcacca	tgtttgccag	gctgggtctcg	aactcctgat
37441	ctcatatgat	ccgcccacct	tggcctccca	aagtgtctgg	attacaggta	tgagctactg
37501	tgctgggcca	agggtgtatg	ttacctttaa	aggccaactc	agtcattacc	aagacaaccc
37561	tcagtactct	aggtatgtat	ttagtctgaa	gaggggatct	agaaggtaaa	gaggtcagaa
37621	cagggaaga	attgaagata	aatgttttaga	ctgtggtctt	aaaaactgct	ttgaactttt
37681	ggcaagatga	cgtccctcct	ccataagaaa	accacagaaa	caccaggcta	aagttcagaa
37741	caaagaaagt	cagcacaaat	gccatcctgg	atgctgagtc	ttatactgat	ctctctaggc


```

37801   aaaatcacac cttacgctta cattcatgtc acgtgtgctc agctctccct ctactggcta
37861   tttcttagct tcaacagtta accacaaatg ctactaaatt acttaattat taaaattaat
37921   tttgagcatt tttaaagctt cctggggcaa ggccagtggt ctcacacctg tgatccctgc
37981   attttgggag gccgaggtgg acagatcacc tgaagtcagg agcttgagac cagcctagcc
38041   aacatggtga aaccctgtct ctactaaaaa tacaaaatct agccggtcat ggcagtgtgt
38101   gcctgtagtc ccagctactc aggaggctga ggcaggagaa ttgcttgaac atgggaggca
38161   gaggttgtag tgagccaaga tcaggccact gcactccagc ctgggagaca aaggagact
38221   ccatctcaaa aaataaaaaa ataaagcttc ctgagttcct ttatttgttt gcttgttttt
38281   gtttgtttgt tttagacagg gtctcactct gtcaccagc ctgaagtgtg gtggcggtat
38341   cacggctcac tgcaacctca acctcctggg ctcaagtgat cctccacct cagcctccca
38401   agcagctggg actacaggca tgtgccacca cacttagctt aaaaaaaca aaaacaaaaa
38461   aagaaaaaca aaaacaaaac aaaacttttag tagagatgag gtctccttat gttaccagc
38521   ctgaactcaa actcctgagc tcaagcgatc ctccatctt ggccctccaa agtggtggga
38581   ttacaggtgt aagccactgg gtccagcctc tgggggtctt tatggtagtc cttggcacct
38641   gctattggac gcctgaatgc taggcctgtt agatgtttct ccattctctc aggctgaatt
38701   tccattgagc tcaactgaaa cactgaagca atgagaccgt ccacagagcc tcatcatcac
38761   cccaaccac ctatccggtg ctctgccctc cagcctgttg ctagatgaac tatccatgca
38821   cccattaaag gccaatccct tctctgtgca ccagattcca tccctctctc taactgaaga
38881   accatgtaga gtacttcctc ctcttctcta attcaccaa ctttactct ccactggatt
38941   attcccatct gtgaacagat ttgatgtcat tcattccacc ttaacaaaca ctccctggac
39001   ctccatttcc ctgccaggta ttagtatatt tctctgcact tctttatgac aaaactccta
39061   ggctgggcat ggtgtcagca ctttgggagg ctgaggcagg aggatcactt gaaccagga
39121   gttcaagacc agtctgggca acataaggaa acccctgttt ctacaaaaa taaaaataaa
39181   aattagccag gcatggtggt gcatgcctat agtcccagct acttgagggg ctgagatgga
39241   aggatcactt gagcctggga ggtcgaggct gcagttagct gtgattgtac cactgcactc
39301   cagcctgggt gacagagcaa gaccctgtct ccaaaaaaac aaacaaaacc ccacaactcc
39361   tcaaaagagt tgtctctact tactgtctca aattcctttc ctctcaagct aatataaacc
39421   tattccagtc aagccttcac ccttcccatc ccattaaagc tgttcttgtc aaagtccaca
39481   atgatectgg tcaattttca acctttatct ttcttgagcc atcaggagca tttgacctgg
39541   ttgatcattc cctcctgttt gacaaacctc ctacacttggt ctttcagata accactcccc
39601   tagttttcat cccatctccc tggaagtgtt cctcagctct cttcactgggt tattccctcg
39661   cttctcaacc tgttaataat aaaatacccc aaggcttcat cttcggtctc tttcctttcc
39721   acagccaccc tgtttcgtag ctttcaattt cgttcacata ccgatggctc tcgactgata
39781   tccagtgtca acctctttcg tgtcttcctg ttcactagtc atccgaaat acaagttcaa
39841   accaatcccc gccagtccct tgaaacacct ctccacctaa ttttctccat ttcactaat
39901   gataactaca tttttccagt cccttgggtca aaaagctttg gtgtcacatt tgatgttgct
39961   gtctgccttt catattccac atctgatctg tcaaaaagtc ttgttgaaat cttcaaatta
40021   tattcagaat ctgaacactt ctcaccacct tcaactgctga ctaccccgat ttgagtctca
40081   ataactctct gcctcattca gtggttccta agttttgctg cacgttgga taaccagga
40141   tcttttaaac atgctaattg ctgactccca ccccttgata ttctgattta ataggtgtgg
40201   gatgtaatct gggcactggg aatttttcac tgctctccag gtgattccaa ttgcagcaaa
40261   gtttgggaat cattggcctg gctatggtaa ccgccacca cctgatctcc ccacttccac
40321   accaaccccc tcccacagtc tattctcaat gcagcaata gacatgcttt taaattacag
40381   atcagatcca ttcaattctc tgctaaaaac accagtggct ccccatctca attagggtaa
40441   aagccaaagg cttttcaatg gccacaaagg tgttacatga gctgcactgc cccctgtccc
40501   atgcgccact cctctgacct ctctttcaca ttgcctcacc cactgctccc gtgatgtcag
40561   cctcctcagt ctcttgaac accccagaca tctctcacc taggactttt tttctttttt
40621   gagatggagt ctgcctctgt caccaggcta gagtgcagt gtgtgagatc taggctcact
40681   gcaactgcca cctccaatt ctctgcctc agcctccgc gtagctggga gtgcaggcgc
40741   gtgccaccat gccagctaa tttttgtatt ttcagtagag acagggtttc accatgttgg
40801   ccaggatggt cttgatctct tgaccttggt atctgcctgc ctcagcctcc caaagtgtctg
40861   ggattacagg cgtgagccac tgcgcctgac cttcacctag gacctttgca ctaaccatta
40921   tcttagccag aaatactctt tcccacatat ctacacatca agtattagct caaatatcac
40981   attgKcaata aggcctactg taaccctat ttaaaattat acctttaacc acctatctcc
41041   ctcccctctc tgagataaaa cagggaagag gtagaggatg gtgccattag ataaggaaga
41101   gcagatctgg agtaataata gaggttctgt tgggacatgt taagtttgag atgcctatta
41161   gacacccaaa tctaacaaga tatcaaata gggaaaagtt ggggttgga tggaacctg
41221   ggagcaaaac cgtggtgctc tggggatcac cttggagaga caaggctgag tgaccccat
41281   ggaacactag tattctgagg tgaggcagag acagagttca caaaagaaag agaagagaaa
41341   ccaagagagt tggagggcc tgtcataaaa gatgttcatg gaagagttga caaaaagagt
41401   caaactctgt aaaatacttg aagagattta ttctgagcca tgattgacca actgaggcaa
41461   gacaggcaag ctccaaaatt ggggctttgc ctgggagggt tcttggcttt gcccaggaaa
41521   caattcaagg gtgagctgat ggtgttaaat agcaacttgc attgaagcag cagtgcacag
41581   ctgcagcaga gggactgctc cttgccgagc agggctactc acaggcagtg cccagaagag
41641   cagctcagag gcagttctgc agtcataatt ataccactt ttaactgtat tcaaattaag
41701   gggcaattta cgcagaaatg tcaagaatga ggatggtaac ttccaggtca tcaggtcatt
41761   gccatggaaa ggggagggtg atgttcaggt gttgccacgg caatagtaaa ctgacatggc
41821   atactggtgg gcatcttatg gaaagtgtct tccaccctg ccctgtttca gctagctctc
41881   aacttgatcc agtgtccaaa ctctgcctcc agaacagagt cccacttctt acctcacatg
41941   gtctgtgaca gagccccagg ggatcctgag aacatgtgtc caagggtgtc aggttacagc
42001   ttgattttat acatttttag gagttataag acattactac atgtaagatg tatattgggt

```

42061	tggtccagca	tggaggaaaa	gttaaataatt	aaatctgaat	tcaattgaac	ctggacacaa
42121	acaatagtc	ccaagtcctg	gaacaagttt	tgtgagtc	ttgaggcttt	catccagcgc
42181	tgtttcagag	aaatctctat	ttcaatctat	tcctatacat	tagttattga	aaaacaatag
42241	acaatagcaa	aaacaagttg	acctttttgt	gttccttgag	cctgggtgtg	aagggccctt
42301	gtgactgggc	ctcatgccaa	acaacttggt	acaaaaagag	ctaggggtcc	aggcccagcc
42361	gaagcttcag	gagacctatc	ctcatctgtg	caaggaggag	tggccaactc	tggagcccag
42421	gctgttgctt	cctgggtctg	tgggtgaatcc	tcctatagtc	ggtgagtgtg	gtgcccactc
42481	ctggagccca	ggatgttgct	tcccgggtct	gtgggtgaatc	ctccatagtc	tgggtgagtgt
42541	agtgtccaag	tctggaaccc	aggctgttgc	ttcttggtct	tgtgataaat	cctccatagt
42601	ctgatgggtg	gggtgtgtgtg	tgtgtgtgtg	tgtgtgtgtg	tgtgtataca	catatacttt
42661	cccttctacc	cttcccattg	caatttgctt	attatatctg	cattgccatt	tacatgggat
42721	aaaggctcgt	tacccttaaa	gggtattgtgt	atgtgtcttt	tcttctcccc	tcacgcata
42781	cccacagaga	acaaccagaa	agggtgggaca	actcaaagca	ttgatgtggg	gtcagggggc
42841	aacactttca	ggtcacaggg	agattcagtt	ttctctgact	ggcaattggg	tgaaagagtt
42901	attatctata	gacctgaaat	gaacagaaag	gaatgtctgg	gttaagacac	agagtgtgtg
42961	agactaagg	tttatcatgc	agaggaagcc	tcagggtagc	aggcttcaga	gagaatagat
43021	tgtaaatgtt	tccttttttt	tttttttttt	tttgagccgg	agtctcactg	tgtcgcccag
43081	gctggagtgc	agtgggtgcaa	tctcggctca	ctgcaagctc	tgcctcccgg	gttcacgcca
43141	ttctcctgcc	tcagcctccc	aagtagctgg	gactacaggg	gcccaccacc	acgcccggct
43201	aattttttgt	attttttagt	gagacggggg	ttcatcatgt	tagccaggat	ggtcttgatc
43261	tcctgacctt	gtgatccgcc	cacctcggcc	tcccaaagtg	ctgggattac	aggcatgagc
43321	caccgcgccc	ggccgtaaat	gtttcttata	agactttaag	agtcggttct	gtgctctatc
43381	agccttaagg	tctctgtgtt	gatgttaaca	ctgggttagca	gctcctgaat	tctaaaaagg
43441	aggagggga	aaggaggcat	gtccaacccc	acttcccac	atggcctgag	ctagtttttc
43501	agtttaactt	tggaaatgcc	tgggctgaga	attattttct	gtttacagag	gagaacttat
43561	gttcattggg	ataggatgac	aatgagggtca	gacaaatacc	actgaacttg	gcaggctggg
43621	aagttacaaa	gcttagcaag	gccagtttca	gtgtcatagt	ggggtcaaag	cctcgttgtt
43681	gcctcaattc	tagtagggta	cataatcctg	tctttattaa	tgggagaggt	tcttaatctc
43741	cagcccatgg	acaaaggaga	tcatagatgg	gtttcaggaa	aacatcccaa	gtcctgcctc
43801	caaattttgc	aaaattttgt	gcctgtgtat	ttttctggag	aacgtaaacc	aaacagtgtc
43861	tgagacaggt	ctcagtcctg	aggtttattc	tgccaaaggt	gaggacacac	ccaggaaaaa
43921	gagacataag	ttatcatgga	atctgtggcc	tgtgggtttt	ccaaagaggg	ttttgaggac
43981	ttcaatat	aaaggggaa	agcagacaga	aggggaaaga	ggaacaacta	tgcattcatt
44041	tcacactcag	taaatctgcc	ttttacagaa	gacaaagtaa	acatagagga	aggagtcaaa
44101	tatgcatttt	tcttggggtg	gactgaagg	tgatttctag	tcttgtcctt	gtcccctacc
44161	tactgtaaat	ttgcatggtc	agggtggaat	tcaacagaag	tgttgtaagg	taaagactct
44221	gccactcaca	aggaatttcc	ctgtgagcaa	ctcctctggg	aggccaccta	gggagatatg
44281	tgggcttctg	tctttgcagc	tgtttaggaa	cagaagggaag	gcagtttttg	cgtgactcag
44341	ttcacaagct	taactttttg	ttgttggtgt	tgttggtgag	acagggtctc	gctctgtcgt
44401	ctaggctgga	caacagagaa	tgatctccac	tcactgcaac	ctccacttcc	gggttcaaga
44461	gattctcctg	ccttagcctc	ccaagtagct	gggattacag	gcgtgcacca	ccacgcctgg
44521	ctaatttttg	tatttttagt	agagacaggg	tttcaccatg	ttgaccaggg	tggctttgaa
44581	tgccagacct	cagatgatct	gctggccttg	gcctcctgag	atgggcatag	tgctagtatt
44641	acatgtgtga	gccactgcgc	ccggccctaa	gcttaacttt	tttcttttgg	agagttagg
44701	gtcccagagat	gttattttcc	ttccacaaga	gacatccaca	gctttcacga	tgggtaccga
44761	tcatatgtgc	cattcatcta	agaccaaggt	gaccacctgg	tcccaaagcc	tgcacctcgg
44821	attcttactc	gattcccgcc	tgggtctctt	caggccctca	gttagtttcc	acaacatggg
44881	agggttcctc	ctccgtggtc	tcgcccattc	gcgttcccac	ccaccctccc	cggatgtgac
44941	gaccctgggc	tcccactccc	ccccatgaga	gaccatccac	ttccaccctt	tcacttaggc
45001	ttcctggcgc	agcctctatc	caggaaactc	gtcccatagc	tgtactgccc	aggctcgagct
45061	ttctaacccc	aagatgccac	tccgttcaga	cgttcccac	ctccatccct	gagaccggg
45121	gcaggatcgc	agcctagggg	cctcacRggc	cgcttgctac	cctgttagtt	gcaacacggg
45181	gcggggcggt	gctttgtgca	cgctggcttc	cggaagagc	tttacgatac	attgaccgac
45241	attttacgac	aggcgggatt	gttttgtggc	tgtcagcttt	cYccgtggtc	tgagtgtgtg
45301	gctgcatttt	tatctctggt	ggctctgcta	cgccggcgca	gaaatgaggg	agaagcggaa
45361	aggtgcgaaa	ggggaaggag	atgggggaaa	ggggtgggtc	gaaagggggc	aacgcccagg
45421	caatcaaagt	ctgaaccgaa	cttttaccgc	gagaatccgc	taccaggtcc	agtcgccccg
45481	ccacctaggg	tcagtgtgtc	cattctgggt	cccagacctt	ctcgtttttc	ctgttttgct
45541	ttttgaagca	ccctaccctt	cctctcttcc	tctttggcag	tcacgtgggt	tcttgtttga
45601	atggcaggga	aaccattatt	ccaatatatg	ccctccgagg	agttaacgtc	gatttaacgg
45661	gttgtaggac	ttttcatatt	ttaagatttg	tttcacgaca	catttgacgt	gttagagagt
45721	ttcttttaaa	gccttatttt	aagatatata	aaaaacctta	attatccttg	gattcagtgt
45781	aagagtgtgt	catgcaatta	ttcccatatt	tattacatca	tgagttagca	atgaacaatt
45841	ccacctttgg	tttttcaaca	ggacggattc	aaatttgaaa	tattctctca	cagggtctgt
45901	tcctattttc	gtatctcaca	ggttctgttc	ctatttctat	tgaccagctg	gtctaatacat
45961	ggtaattgtt	gtcagaataa	tagctaccat	ttattgagct	tgtattttga	agtcgggtatc
46021	atttccattt	tacagatgaa	gaagctgaga	ttcaaagagt	taagtaactt	tcccagacca
46081	aaattatact	tagatatgga	gctggctggg	caggctgtat	ctgtgacctc	aaaaaacata
46141	aaatgaaaaa	taaatacatc	gttaatcMct	atgcttcttg	acattaactg	ttatttttct
46201	ttcttccaag	caacaattct	aagtggtccaa	gttaccttag	attaagtctt	gtcatatttg
46261	catgccctaa	attaattttg	tatctcactc	taacttgctc	cttctcaatc	taccaggatt


```

46321 ctttttagYtt cttctgtcac caagtcattgt tgattcttac ttagaaatta cttcttgata
46381 tagtttattc ctcttcattc tggccgccaa cctcctaacc caccttcac c actaactaat
46441 atttgaatgg tatttcagct ttcataataca ttattttattt gagtcttaga atggttttgt
46501 gaaatttgga tgtattaccc caatttttaca gacaaggaaa tgggcactca aaagtgtgtg
46561 atcttggcca ggcgcggtgg ctcatgccgg taatcccagc actttgggag gccaaaggcgg
46621 gtggatcact tgaggtcagg aattggagac cagcctgacc aacgtggtga aaccctgtct
46681 ctactaaaaa cacaaaaatt agccgggctg ggtggcaggt gcctgtaatc taatcccagc
46741 tacttgggag gctgaggctg aggctgaggg agaggcgga gaatcacttg aacctgggag
46801 gtggagggtg cagtgagccg agatcgcacc actgcactcc agcctgggtg accgagcaag
46861 actctgtctc aaaaagaaaa agaaaaagaa aaaaaattgt cgatcttttc cgttaccaca
46921 cagccagtag gcattgggac tggatcctgt cttagatttt gtgggttttt taaaacaatg
46981 ttgcctttca agagccattt gagtagtata catattatat gtattctttt tcactttctg
47041 aatcattctt tgtaccgata atattcttac cttccttaaa cgttactttc aactttttat
47101 ttccaaagtt gagaatatgc aattcttcac tgtctgttgc attccatttc aatgcctttg
47161 cctagtggcc aggggtccct gtaatctgtt ctttattaca ccctgttaga aagctggatt
47221 ttagttaggc tgtgctgttt cacacaaaga taggtaattc ctatgcctga cattatttct
47281 tctggattgc cttctgtttt gcatgtccaa atcttgccct atctttaaag atccctgtgc
47341 catttccttc atgaagtctt ttcctactca tttactcttc cagttcttga tacactcaag
47401 agctatacaa gtggttttcca aatcttatct gttcttatca gccgatcccc ttttaccctc
47461 caaataaatt cttacacaga acctcaatat ataaacagct gaaagcagag ctgctgtggt
47521 ggaaataaag agacctctc ctttttttcc tccatgcctt attttcctct tcccttctcc
47581 ctccctctgc catgaccacc accagtctta cctctgttgc atggcccttg aggcacctt
47641 gtagaactct ggaagtgtg agttacatgg tttggaaagc atttagcctt tgagtataga
47701 tggactttat ttctctcaaa aattgttgtg tatatgttag ccttgccctca ttaaattaga
47761 tgcagtgtgt tacagtga aaagcatgga agttgtggtg aaaagagctg gatttgagtc
47821 ttggctctgc tgtttacgat agcttgttaa cttgccttag cctcattttt cacatctata
47881 aaatgggata acagtacctt ccctccgtgt tactgtaagg gttcaaata gaataagtaa
47941 atgtgtgggc tccataattg ccagggcctt ccatccacgc tttcattatg ttttagcttt
48001 ctctgcagtg tgagtcctca gcccctggg ccacggacca gtaccggttc atggcctgtt
48061 aggagctgag ccagacagaa gaaggtgagc agcaggcgag caagtgaagc ttcacagta
48121 tttgcagcca cttcccatca ctcatgttac tgcctaagct ctgcctcctg tcacatcagc
48181 agtggcatta gattctcaaa ggagtctgaa ccctgttgtg aaccgtgcat gtggtgggtc
48241 taggttgtgt gctccttatg agaatctaat gcctgatgat ctgtcactgt ctcccatcac
48301 cccagatgg gagtgtctag ttgcaggaaa acaagctcag ggttccact gattctatgg
48361 gaacagaatt cgttatggtg aattgtataa ttatttcatt acatataaca atgcagtaat
48421 aaaaataaag tgcacaataa atgtaatgca cttgaatcat cctaaaacca ccctgctccc
48481 ctggtctgtg gaaaaatcat cttccataaa accagtctct tttatcaaaa aggttgggaa
48541 ccactgctct acaggtgaga agcttgcctg ctgacagctt ccaagctgat atcccacagc
48601 ttttgtccct ggaaaaagac tggcattttt taccttgaag aaaagagctc agattggcct
48661 ggcttagaga tatgcccata cttgaaccaa tccttgaact gtgcttgagt ggatggcgtc
48721 atacaagaac ctgtcagctt ctgctgttgc ctttggatga gaccgagagc cccagttgcc
48781 agaagttcat gatggtggac agacaatatt ttagaaatgc attagattc ttaggcagat
48841 acctgggttt gagtttcaac tttactcctt gatagcatct tcatgtaaca ggcacatatt
48901 cttgttctgt ctacctctgt tctgagaatt acctgaattc atgcatctaa atgttcttta
48961 tgaactctaa agtattatgc acatattagt aattacacct ctggagataa aggggaagaga
49021 attactttgg tcctttcctg tgtgattaag ttctttctcc tcacattgtt tctactYctg
49081 tatcctttcc tgtattttatt ttaataatc tcatagagta tgtgcttcta aaggagctt
49141 ttcccatata tatgtaaagc cacgtttgtt ttaaagatac aaaagatatg atcaaattgt
49201 aaacagtaga gatttagcat cttctgaact tgagctattc atttggcata tttgtatggt
49261 ttcggatgga aaactgctac taaatcagat tttaaaatct tgattgaatg atacgatttt
49321 tgacattgtt gaatatatac tttccaggag atctcagccc tgctgagctg atgatgctga
49381 ctataggaga tgttattaaa caactgattg aagcccacga gcaggggaaa gacatcgatc
49441 taaataagta agtggatata aagagagagc aagcctgttc ttaggtagca gatctctttt
49501 atgaaattat ctagtactac ttgttttcca gctcaagttt tattttagtt gagaatttta
49561 gctttctgcc ttgccttgtc attcattttc tttttttttt ttgcaagttc cgctctggg
49621 gttaacgcca ttctcctgcc tcagcctcct gagtagctgg gactacaggc gcccgccacc
49681 acgcctggct aattttttgt attttttagta gagacggggg ttcaccgtgt tagccaggac
49741 ggtctcgatc tcctgacctc gtgatctgcc cacctcggcc tcccaaagtg ctgggattac
49801 aggcgtgagt caccgcaccc ggccgtcatt catttcttga tggcaaaatt gtctcagctt
49861 aagaatacta atagcttcta acatttattg ggcacttact gtattccaga cactgttgct
49921 aatgcattgt atgtattagc tcagttaatc ccctcaaaat tctgtgagat aggtactgat
49981 accagccaca cttgacaggt gggtaatctg agtcagagag cagttaaata atttgtccag
50041 gggtaagtaa ctagtaattg gcagagctgg gatttggaat taggtcagcc gtctccagag
50101 cccatgttct tctgtgctgc atcgctgcac atcctacttt ccttccctac tgtctcagct
50161 gaagcagcag ctttctgtca ggaaaaccct ccctttgggg ccctgatct aatccaaccc
50221 tcccctgctg tagaacctct ttgacacatt catccacttc ctctccataa tcattttcag
50281 cttggacttt cctacagtct caaataagag ttgtctttca tctctgcac taatgaaagg gttctctccc
50341 ttcaaactat aatatatatt cactctatgt agatcttccc taatgaaagg gttctctccc
50401 caaccccagg tctctaatc atcacatata ggaatgacct tttcttagac tctctctct
50461 gatacttgag atgctgcaat attttaccoc ttccttgaat cctcatgctt agtaaataat
50521 tgctacagga ataagtaaat atcctctttt gactataaag ttattgtatt ttactgattt

```



```

50581  ttctaccgtg  tcttttagaag  tttttctttc  tttttttgtt  ggttataccc  ctgattatac
50641  aaatctttta  tttctagtga  acatttctac  atcttatata  tatttggtgt  tctctttaat
50701  ttagcacatc  taaagctaaa  gctgccatcg  tccttaaaac  tcgcccctcc  tcagatgtca
50761  ccagcctatt  actggaaggt  ctctcagtc  ggcttcaacc  tgcttttcca  agttttttaa
50821  cctctgtacc  tttacattga  aaatcttctg  ctttctgtca  agttgggtct  cttgtatttc
50881  ttaaaatata  tgcattcctg  tttttgcatc  tgcacataaa  tcagcctgtc  tgcccctccat
50941  gtcactcttg  tgtcttttagt  gactgagacc  tactctttct  tctgtgctca  tttccatgaa
51001  tatctcccca  gcacacatca  gattcctccc  tgaactctgg  aagcattcat  tgttgggtatg
51061  tgtgtgtgtt  ttatgacata  tgttttaatc  atttatacat  taattttctt  ggtacgcctg
51121  tctgcaaaca  tgtaaacata  gaacatgaaa  ggactgtgcc  ttgcacattt  gaacatagca
51181  ggtattcagg  cagcctcttg  tacgtgttag  gtcctcagtt  aatatttgtt  gacaaatatg
51241  tgagcacttc  acagatattt  ctagatggat  taaagttaga  agacaggggtg  actgttaaga
51301  gtttggctag  gaggcacaaa  gaaaagctgg  taaaagtttt  ttttaaactt  tcaaaaatat
51361  gtactttatt  tcctatttgg  ttctgcatag  ccatccttga  tttttttttt  aattgttgtt
51421  gttgttttgt  ctaagacagt  agttgtcaac  caggggtgat  ttcctcctca  ggacatttgg
51481  caatgtctag  ggacattttt  gagtgttaca  acaggaagac  aagaagaagg  ctggtagtac
51541  atagagacca  aggatgctgc  taaacatccc  tcaattcgct  ggccacctgc  cacagcaaag
51601  aactgtgtgg  tcccaaacad  cagtagtgct  gaggttgaga  aagggtggagt  cagaatagtc
51661  ctttgaagct  gcagcactat  tctgaactag  atctatattg  tgtcatcgtc  cagggaccct
51721  tctccctcca  tagtcctctg  gttttctttc  tgggtactcaa  ggggtgggaag  tagtcattca
51781  ctctgtgaatt  ttattcttct  atttccctga  tagtcacaga  tcttaaaact  atccttgtca
51841  cgtggtgaag  ggattggaga  gtgacagttg  ttaatgatgt  tgtttataga  tcctcctctt
51901  ggtagcttgt  ccttaaataa  ccgtRatctt  gataatgtga  gatgctttac  tttcaggggtg
51961  aaaaccaaga  cagctgccaa  atatggcctt  tctgccccagc  cccgcctggg  ggatatcatt
52021  gctgccgtcc  ctctcagta  tcgcaaggtc  ttgatgccc  agttaaaggc  gaaacccatc
52081  agaactgcta  gtgggggtgag  tgattcgact  catgagggtat  cgacacactg  ggtatctgtt
52141  Ytggcagaag  tccctgctcc  atgtgacRcc  cgtgtagtga  ggtagagggt  ggggattctg
52201  aactaatgaa  gtccctgtat  taggatattg  gctggagtgg  agacctgtgc  tgaatgcaag
52261  gagagcagag  agagaaaaaa  atataattgt  gattaaagga  gtagatgatg  ttttgacctc
52321  tttaaaaata  tagatttagg  cttgggtgaca  atcataacag  gataaatgtt  ggccatctta
52381  agctggtagc  tttcaatata  attgatgctt  atgaaaggta  cttttgaaag  gtagttaatg
52441  gtgcaaagta  gttctgtata  tgggtgattat  gagcactgtg  gaagtccaga  caacagcgat
52501  gtccctgcag  caaaaggggc  tggggaaggc  ccagtagaaa  gcacacagct  tgcttgacct
52561  ataagccaag  aagagcaggc  tctaagtgtc  atgggagcaa  ggacacaggg  gctaaggcac
52621  agaggtagaa  atgacaggaa  gggcgtgggtg  cacgcaggaa  atagcgagta  cgccagactg
52681  aagggtgtta  acagttcagg  agagtaggac  tgtgcgttga  acaggtagtt  tgggatcagc
52741  ttgtaaaaat  cttaagtgtc  tggcaaagca  gctagataat  aggaaacaaa  agttttgaaa
52801  aaggtagtaa  tatgaacaaa  gtagattttc  agaaaattaa  tttggataca  acatgcaggg
52861  tagtttgagg  acaaaaagac  tagcttagat  gctcttggtg  tgatgtcagt  atgcagtgtt
52921  aaggacttga  gttaggatgg  agactctagg  atgaaaaaag  atgagtgtga  gatacatgca
52981  cagaaattga  tagaattaag  accctcctac  catatggtcc  ccagcaccaa  attctgttcc
53041  taatgtgatc  ccacaagttc  attctgttat  ttgaattggg  atattatatt  ccaggcagct
53101  tgtgttgact  tggtgacct  atctcctgga  tcaccttacg  tttgtggcta  attaaaccct
53161  aaaattttta  catacaatgt  accaccaaac  ctcatatcct  cttctttgta  cttaagtgtt
53221  tttgttttgt  tttgttttgt  tgtatctagt  gtaaaaagct  tgtagccag  gcacgggtggc
53281  tcacgcctgt  aatcccagca  ctttgggagg  ccgagggtgg  ccgatcacia  ggtcagggtca
53341  agaccatcct  ggctaacacg  acgaaagccc  atctctacta  aaaatacaaa  aaaaaaaaat
53401  tagccgggcg  ttgtggcggg  ggctgtagt  cccagctact  ccagaggctg  aggcaggaga
53461  atgggtgtgaa  cccgggagggt  ggagcttgca  gtgagctgag  atcatgccac  tgcactccag
53521  cctgggcgaa  aaagcgagac  tccatctcaa  aacaaaaaac  aaaaaaactt  gttaagaaaa
53581  actaatagtc  catgcccctc  acctcccttt  ttctacccta  gggcaaccat  ttttaactct
53641  tagccaattt  ctttagcatt  aacttccata  tccataaata  aaataacatt  ctttacataa
53701  tagataagtc  ttgactttct  tttttttttt  ttttacctga  gacagtcttg  ttctgttgcc
53761  caggcaggag  tacagtggta  cgatcttggc  tcaactgcaac  ttctgcctcc  caggttcaag
53821  cgattcttgt  gcctcagcct  cccaaggagc  tgggattaca  ggcatgtgcc  acaatgcccc
53881  gctaattttt  gtattttcag  tagagacagg  gtttctactat  gttggccagg  ctggtctcga
53941  actcttgacc  tgagggtgat  tgcccgccctc  agcctcccaa  agtgctggga  ttacagacgt
54001  gagccactgt  gcctggccga  ctttttagag  ttaagcatta  tgtgtgggct  tgccattaaa
54061  gaagacagaa  acttagcaac  ctttcagcct  gactggcaaa  ccgaggcttc  tgtgatacca
54121  ccctctctgt  ttcttctctc  gtctctgatc  atttctgtcc  tatcttggct  accttattgt
54181  gcttacctct  aaaagttgat  gttttctgtt  gtcctgggct  cattgtgttt  ggtattttac
54241  atgctttctt  tggtaacctc  atccatttga  tgatttttagt  attgatgtat  gctgactccc
54301  agcatgaacc  attccctgag  cttcagactc  ctgtcagatt  gtcagttagg  catctgtcct
54361  ttgactgcct  gagaacctcc  tgaagtatag  cataaccaa  actaatacca  gacttgctta
54421  ttcacctttc  ctgtccatgt  tagttcatgg  taccaccgtg  cactcagttt  ccaaaaaatg
54481  tgaaatgcat  tttccgttcc  tactgccact  ggtaagaatg  ctttggcctt  tattatttct
54541  tgtttagatt  atttcagtca  tttccttacg  catctatttt  gtcctaccta  catgaaatgc
54601  atctttaaca  gtgtcacaag  agtgatctat  tgaaagtatc  agaaacacac  agctgggtggc
54661  cattccctat  ctactgccat  tctcacctcc  atgcttttat  tcttgctgtt  tttctgatgg
54721  tgctttgttt  attttataca  gtagtttttag  gtttatagag  aaaaaaaatt  tatacacttc
54781  ctctagcacc  ttcaccctca  cccagtttcc  cctattatta  atatcttgca  ttgtttggta

```

```

54841 catttgtag aattgatgaa ccaatattgt tgcattatta ttaaccaaag cctgtacata
54901 cattagaata cactctgtgt tctacattct gtaggttttg ccaatgcata atgtcatgta
54961 tccactatta ctgtgtcata tgaaatagtt tcactaccct aaaatctcct atttgtggcc
55021 gggcgagtg gcttatgcct gtaatcctag cactttggga ggctgaggca ggcagatcag
55081 ctgaagccag gagtttgaga ccagcctggc caacatgggt aaaccctgtc tctactaaaa
55141 atacaaaaat tagccgggca tgggtggcggg cgcctgtaat ccagctact tgggaggctg
55201 aggcaggaga atagtttgaa cccaggaggc agaggttgcg ttgagccgag ataatgccat
55261 tgcactccag cctgggtgac agagcgagat tctgtctcaa aaaaacaaac aaacaaacaa
55321 acaaaacaaa acagctccta tttgtccctt tccctctgca tgttctagac gtaacctgac
55381 ttccactgat tgttttattg tctttaataa agtttgcttt ttccagagtg tcatgtacag
55441 taattggaat catacagcct ttccacttag caatatgcat tgaagtctgc catgtctttt
55501 tgtgacttgg tagctcattc ttttttttta attactgaat gataatccat tgtacggatg
55561 taccactatt tgcttattca ttcacctatt gaaggacatc ttgggtgctt ccaatttttg
55621 gcagttttaa acaaagctct gtgaaggtta ttgtgtccac ctacattttc agcttacttg
55681 agtaactgtc aacaagtgc actggtagat catatagtaa gactatgttt cactttgtaa
55741 aaaactgcaa actcttccag catggctgca ccattttgca tccccaccag cagtgagtga
55801 gcactctgat gttccacatc cttgctaaca cttggagatg tcgggtgttt ggattttatt
55861 taattaattt atttatttta agacagggtt ttgtcctgtc actgaggcta gagtgtgggtg
55921 gcatgatcac agctcactgc agcaacctcc caggttcaag ctatcctccc acctcagcct
55981 cccaagtaac tgggacaaca ggcattgcacc accacaccag ctaatttttg tgttttttgt
56041 agagacaggg ttccaccatg ttacctagga tggctctgag ctctagggt caagggatcc
56101 tcccagcttg gtctcccaa gtgctgtgat tataggcgtg agctatgggtg cccagccagt
56161 gttttggatt ttagccattc tcatagttga acagtggat ctcttggtg tttagtttgt
56221 aattccctaa tgacatgatg ttgagcatct ttccgtatac ttatttgcca ctgtatatct
56281 tctttattga gatatttagt cacatctttt gccctgttct taattgggtg ttttcttact
56341 aggttttaag agttctttgt atatcttagc tgggaagtgg ttatcaggta ccaattatgc
56401 agatattttc tcctagtctg tggcttgtct tttcattgtc tttctcagag cacaactttt
56461 aaatatagac aattagggtc ataaccatt ctgagtttgt atttgagttc gtgttttgtg
56521 tcttgaaaca ccatgggtgt taacttggat acattactgt catctaagcc tcagacctca
56581 cttaagtttc accagccgtt tcaataacat cccacagaac ctagttcaga atcacctgtt
56641 gcatttaatt gtcatatatc tttagtctgg acatttcctt tgtctttttt ggactccgtt
56701 atcttaacgc ttttgaagat ttctggcaag ttatttttgta gcacgtccct cagtgtgggt
56761 tcatcagctg ttttctcatc atgagattca ggttacgcgt ctttggcccc tgcctcatag
56821 aagcagcact acgttcttct cgtcatctcc catccagtg tgcgcagggt tggttttcct
56881 atcactgatg ttctcattt tgatcaagg gctgtccacc agacttacc tctgtcaagt
56941 tatttttttc cactttgtat taagaagtgt tgtatggaga aatactgaga aactaggtgg
57001 atatcctgtt tctcatcacg taccagttc actcctttat ttgtgtgaag gaattaatgg
57061 tttcctatth ggtgggttat catctgttac tatttatttt gatgcacaaa ttattgtgga
57121 cttgaccagt gggagccttt tcaagctgat ttctatgtct ttttaaaatg tctcatcat
57181 tctttgagca gtttctagct ttctagcaca ataaaatgtt ccaggcttgg ccagacatgg
57241 tggctcacgc ctgtaatccc agcactttgg aaggacgagg tgggtggatc acctgagggtc
57301 aggagtttga gatcagcctg gccaacatgg caaaaccctg tctctactaa aaaaaaaaaa
57361 tacaaaaaat tagccaggca tgggtggcaca tgcctgtaat ccagctact tgggaggctg
57421 aggcaggaga attgcttgaa cccaggagggt ggaggttgca gtgagccaag atcacgccat
57481 tgcactccag cctgggcaac acagtgagac tccgtctcaa aaaggaaaaa aaaggaaaaa
57541 gttccaggct tatcttagac tttctttgtc ccagccctgg aatcagccat ttccccagg
57601 agccctgggt tcttttagtt ggagaaggat atttagatac taagacctgg gtcctagggtg
57661 tgcttactgc tgttaggggt ttgctgctgc cagactctct cagtggacca agcgaggaca
57721 tatatatgta tagctgcata cataacatgc acacatacat gtaacacatt tccatttgta
57781 tttattttatc agtctaccat atgttgaaca ctctgattgg ccacaatacc ttttaattcca
57841 cccagcccac agagttcatt ctgcttctct ctctttccat gtttatagct acttctctga
57901 tagtaagaag cctggcttgc tttcactttt gtaaattggc agatttgacc aagtgccttg
57961 gatgtaacca atcttgcgtc tctgccactg cctcctgtcg tcacctcact gaggtctgtg
58021 cagacccctc tgaggttatt tacaccaga ccctgaaaca tgaagctgct agtttaatag
58081 tacctgctgc aaatattgag atccagtggt ttcatgaggc gtttgagtca caaagggttag
58141 gtttatatat aatttcatag aattgcttaa agaaattttt ttcttacagg ctgtttacta
58201 agacaatcag agagagaaag actaagaatc actttggctt taacagttaa tttgttattt
58261 tgtacttaat ttattgtaaa atggaatata acttcacata tatattacat acggacaatt
58321 taaagatgat taatattgaa cagagatcac tcttgtacce attgccagc ttaagaaata
58381 cagcctcggc cgggcgcggt ggctcacgcc tghtaatcca gcactttggg aggcgagggc
58441 gggcgatca cgaggtcagg agatcgagac catcccggct aaaacgggtg aaccccgctc
58501 ctactaaaaa tacaaaaaat tagccgggog tagtggcggg cgcctgtagt cccagctacc
58561 tgggaggctg aggcaggaga atggcgtgaa cccgggaggc ggagcttgca gtgagccgag
58621 atcccggcac tgcactccag cctgggcgac agagcgagac tccgtctcaa aaaaaaaaaa
58681 aaaaaaaaaa aaaaaagaaa tacagcctcg tcaatacctt tgaagccct ttttgccact
58741 ctctgggtgc attcctctcc ttccttccga gggataagca ctctgtggag ttttatatta
58801 attatcctat aatagctttt ttattcatct ttcttttata gattgctgtc gtggctgtga
58861 tgtgcaaacc ccacagatgt ccacacatca gttttacagg aaatatatgt gtgtaagtat
58921 ggtgatttta ttaaatgtga tgtatgtttt aattaagcta aatatgcccc ctctagccct
58981 tagtcagtac atcctggtaa tgtttaaaac ttcagcttaa tagatttata gattactcct
59041 ttcaaacaag caaccattgg tagatattht agtgctthta aattggaata tataaggccg

```



```

59101 ggcaaagtgg cttacgccta taatcccagc attttgggag gctgaggcag gtggatcacc
59161 tgagggtcagg agttaagacg agcctggcca gcactgtgag actccgtctc tactaaaaat
59221 acaaaaatta gccgagcgtg gtggcatgcg cttctagtcc cagctactta ggaggctgag
59281 gcaggagaat cgttttaaacc tgggaggtgg aggttgcagt gagccgagat cacgccactg
59341 cactccagcc tgggcaacag agtgagactc catatcaaaa taaataaata aaattagaac
59401 atatgaatat tttaatattat tgcaatatac aattctaaaa atgtaggtta tggaaactcac
59461 aacagtagac attgggatat gcaactcaaa acagcacatt ctgttaaact cataaatgaa
59521 acatgggaat atgagctgcc taaattccac gtcagaaatt taaaatgaat ttggatcaga
59581 aacatatcaa aataaaaaat tatccttata cgtaaccttt agattttctca aactcaccta
59641 tttgaaagaa ttagcggaag agtttgcatt attctgggta ggaagataaa aggggggaaa
59701 gattttcttg agtgtgttcc ccaagagaac actgagtatt gattcaaact taggaaaact
59761 tcattttctgt tatttgcccc taaaagctta aacctctgaa ataaacacaa ctgcagttat
59821 tttgaaaatg ggtgtaataa tgtcccttta catatttatc ttattttactt cttggtagaa
59881 aatacattat ttacagatac tgcaaaggta gattcttctg ttaggatttg aaaaggaagc
59941 tcatttggtta tcaggattct ttggagatgg tagatgcttg gaactagctg attgaactca
60001 gttttgcatt tgacattctt gttcttttgt tgtactggca gatactgcc ttggtggacct
60061 gattctgatt ttgagtattc caccagctct tacactggct atgaggtaca gtaactttga
60121 ggctgtcctg atgaaatgtt gcatcatgct ttacctgtag tatgggttta ccagtactgg
60181 ctttctgaca attttttgtt tttgtttttg ttttttctg atttttaaag ctgttcattc
60241 accaaatatt tgccagtgtc tactagtgcc ctatattatt ctagccacta gagaaatact
60301 tacataagca taaataatac ttacttctta tcccaaagtc tgttctaagt gctttacaac
60361 tgtaaaccctt attgcagtgt tttgaagata gacactatca tgatcccagt ttgccaatca
60421 ggaaactagg gcatagcagg cttaaacagc tggcccaaag acacactatt agtaagtgaac
60481 aaccagggtt cgaagtctgt gctgcttacc actacattgt actgtcactt tagcagtgga
60541 aaatggacag ggtcccattg tcttctggaa tttacatttt tttttctttt tttttttttt
60601 ttttgagatg gagtctcact ctgttaccga ggctagagtg cagtggcacg atctccttca
60661 ctgcaacctc caccctctgg gttcaagtga ttctcctgcc tcagcctccc gagtagctgg
60721 gactacaggc aagcaccacc acgcccagct aatttttght tttttagtag agacaagggt
60781 tcatcatgtt ggccagcctg gtctcgaact gctgacctta agtgatccgc ctgccttggc
60841 ttcccaaaat gYtgggatta caggcgtag ccactgtacc cagcctggaa tttatatatt
60901 aataatggaa ggtagacagt aaagaaacaa gaaaaagtat caggcactca aaaaatgcta
60961 agcagagatg taaaatcaag taagggtgat gcagctgaga tggtttagct gtggtcgtta
61021 ggaagggatt ctgtgaagtg agattgaagt tgagtctgaa tgacaagaag gacctagtcc
61081 taagaatatg tgaaaggggc attcctagca gagaagtcac tagaatgagg cccaaggaag
61141 gaaagacatg ggggtgttgt gcagtgcagg ggggtgaggga agcatgaggc tgggagtga
61201 aatgagctgg ggtttgtaag caaaggtaag gagtttccat tttagcgtag gagtcatgag
61261 aagctattag gatttaaggc aggggaatga tacaatccaa tttaggtttt ttgaaagatc
61321 attttgatgg ccatgtagag aaagggttag agtgagagacc agaaagaagg cagaaggcca
61381 gtgaggtgct tttgaaggag tcaccctcct cagaacacct cagaagccag gaaagcttgt
61441 gacttttttc tcatatctgt tttcattttt tttcttggtt tctagggttc aaatttttta
61501 aaatacaaga ggaatgattt cgtgaaaagg cttcctctca ttcctatccc ctagccactc
61561 tttttcactc ttccccctac cagttagtgt tgtttgttat ttctcccca tcttcaggg
61621 atattttagg gaacacagca tacacagggt gcctatccct tatgtgaaat gcctgggacc
61681 agaagtgttt cggatttttg atttttctgg attttggaa atttgcatat acatagtga
61741 aaatcttgag agtggaaacc gaatctgaac atgagattca ttttgggttt atgtacacct
61801 gatacaccta ggctgaatta attttataca atatttttaa taattttgtg cgtgaaacaa
61861 agtttgtgtt aagtactatg tgtggaattt tccagttatg gcatcatgtt ggcactcaaa
61921 aaattatgag gtttggagca tttttgattt ttggattagg gatgctcaac ctggacgtat
61981 tctttatttg actgattcca tataaggtag catatcagag tctcttttca ctttgccttt
62041 tatttttaca tatcttagtg aacattttat gtcagtacat tgtttcgtgg ctgtagagta
62101 ttccactgta tgggtgtagc cattacaaac tgtgtggtat tttagaagct tacttaaaag
62161 ttactttatt atatgattct ggtatatgta tgcacatcta tgtctgtgag cagaacactt
62221 tggtgaccct gggattccag aagtgtttat acaaaagaca gatgtgatcc aaggagacac
62281 cctgctgttg aggtgtttat gacagcgtga gtggacacct gccagatgcg attcaggaca
62341 ttattttgaa ccctgacaag actgagaaaa attaatgctg gtacaagcca cgttttcagt
62401 gttcggaacc atggagagtt ttttttaaaa tacagtcctt ttgaaactac tttttagttt
62461 taattcaRtg tgggcataac aatatttttc tcttctagcc aacctccatg agagctatcc
62521 gtgccagata tgaccctttc ctacagacaa gacaccgaat agaacaggta cattttttaa
62581 aaacatgttt cttaaaaatt aggtgtttat acttagtaag aagccattgt tgcttgattc
62641 aaattgaacc tgaaataaga atgaaaaagg tgtttttcct ctttgtaagt tttcaatatc
62701 catltgaggg agggagaatt tgccatgcct agcaaggctc tctctaagtt tttttgaatt tgtagaaagt
62761 gactgtattt attgttttaag ggttttatac tctctaagtt tttttgaatt tgtagaaagt
62821 catltgtagt atgaaatttg tggaataaag atgtatgaaa gttcttagac aatgggtggg
62881 tgtgttgact ttttaatttc aaaagtcaga ttaagaagta ttttgactgg ccatgcgcaa
62941 tggctcatgc ctgtaatccc aacccttttg aaggctgtga cagcaggtca cttgagccta
63001 agagtctgag accagcctgg gcaacatagc aaaaccccat ctacaaaaaa tacaaaaatt
63061 agcatggcat tgtggtgtgc acctgaagtc ttagctactt ggaaggctga ggtggaagga
63121 tcccttgagc ctggaaggtc aaggctgcag tgagctgtga tcataccact gcacttcagc
63181 ctgggtgaca cagcaagaac ctgtctcaaa aagaagtatt gtgacagatt tgttgggtgg
63241 aaataggaaa tttcctacaa aggagtacaa agaactagtc ggggtatggc attgttctct
63301 atcatgggtca tgggtggtgg tacataactc taaatatcta tcagctctca tccattgtac

```



```

63361 acttaaagtt agtggatttt atcgtatttta aattatacct cagtatgggt gactaaaaac
63421 aagtactatg tacatgacct tgcagtgttc aagaaatctg aacattaata cagatttcct
63481 ttattttacaa gtttattttta aacttgtcca atttaaaaaa tgtaaagcac tgtccatagt
63541 tgtaatatga atgtatatga ggcacatcca agtctaaagt agataatggt acataaccat
63601 agtggataag ttgtctctgg gtttgtttat tggcttattg gtgaatactg ttcagtttta
63661 atatccactt tgctgtcacc caagcgtatg aggaacagga ttgtcgggtga caggagagga
63721 ctccatctgg gggagcccac atttttccaa acagtgggtt ctaaactgac ctttgcctca
63781 atttcttttt gggctatgat agttaattta tttaaaatgt aaaactattg agcatgaaat
63841 gcttatgttt accaaaaaaa ggagcatagt ttacaagatt tagaaatgaa catagagcag
63901 tgattctttt cttaaattgca ctagaattac ctgagtaact tctccaaaac gtgtcacatc
63961 ttcacctcgg gaggttctga ttaagtctgc ttttaagggtc tagcaagata tttttaaaaa
64021 ctaccagggg aattttgatg agtatctctt gtaaagaacc atagatacag aaatagagta
64081 ttctttttagt gttgatatat atgtacacac atgcatatat atagtttttc tgtatacgtt
64141 ttttgccatt ttcagaaatt agtgtttaatt tcaataccta tttttaaaaa ttagaatctt
64201 ggcttattgt agtcaacaaa atgaaagatt tgtatcattc tctccactag tagaggagac
64261 ctaattttat tattattatt tttttttttt taaacagagt gtcactcttg ttgcccaggc
64321 tggagtgcag tggcacaaatc ttgggtcact gcaacctccg cctcctgggt caagcgattc
64381 tcttgccctc gcctccagag tagctgggat tacggcatgt ctggctaatt tttatatattt
64441 tagtagagac ggggtttcac catgtttggc aggctgggtc cgaactcctg acctcagggtg
64501 atctgccagc ctggctcctcc taagtgtctg gattacaggc atcagccacc gcacctggcc
64561 tgaatatattc atttttaatc agactttcac ttttttttag aaagcagact tgaagtgcct
64621 cctgtgcctg gaatcatcca tcaatttttag actgctgtct tgatttttct ttccaatcta
64681 ttcttttttt ctccatttac atcaaactcct tattatgtta cataatcatt catgtatcat
64741 tgttgaccat aaatgccacc tttttgtcct ctaggcttac caccaagtct gacataaaat
64801 acatgatcaa taaatactta ctgttttgca aattgtatta tatttgtctt tactgctttc
64861 tagtttatat tcttcgtgtt tttaaatttc cgctttgtag gtattcaagt caagcctctt
64921 atttgttatt ttatatcttc attctccctc ctatattgag ttgtactcac ttttttcttt
64981 cagacttggg cctatttttt atccacagaa ttagctaagt gtgtttcatt acttctgatt
65041 tttaaactgt actgatgaaa aactgcaaa ataagagatt tgcaatgcct tcttagagta
65101 gttccttatg cttatatcat tctaattgct atgaatttgt ctttcagtta aaacaacttg
65161 gtcatagtgt ggataaagtg gagtttatgt tgatgggtgg aacgtttatg gcccttccag
65221 aagaatacag agattatttt attcgaaatt tacatgatgc cttatcagga catacttcca
65281 acaatatatta cgaggcagtc aagtaagaaa ttcttatttt atcatagtct ccagagtgggt
65341 tgtcagttta tgctcctagc agtagtctac gagaatgcct tctgccctgc atccacattc
65401 ttacttctca taatctttct tgtttcatgg gaaaggatta tttcagtga aataatgctt
65461 tcgctgaaat aatcttttcc agtgaaaata atcctttcac tgaaataatc cttttaaaga
65521 aaaaatgaat acagtttgtt gacatagtag tattctcaaa tagagagatt cKccaaatat
65581 ggtccatgaa tgtcttttca gccaccccaa gaaggggggt ttagagtaaa tatttcataa
65641 aaaatcagca aaacaaggta ctgttatttt atgattggga tcttagtctg tgttggtgctg ctgtaacaaa
65701 ttattaaata gtaactgttt atgattggga agaatgtat agaatgtat tggctcacag ctttggaggt
65761 atatctgaga ctaggttaatt tataatgcac agaatgtat tggcaagagc cttcttacta cgtcatcaca
65821 tgggaagtcc aatgtcaagg tgctggcatc tggcaagagc ccaattcacc cttttataat ggcattaatc
65881 cggcaaaaga caagagaaac aaaaagcgga gtccacacct ttaatactgt tacaatgaca
65941 ttaccacaaa ggtcagatcg gagttttaga ggggacaaac tcatgtctgt caaatcatgt gttattcaaa
66001 atttcaacat attttagtcat tttgaattct agttgacaaa attatgcatc attttgacac
66061 ccacaagtta attttagtcat tttgaattct agttgacaaa attatgcatc attttgacac
66121 cttgtttttt gcaagaagaa tactacaggt tagtatgtag ttcagtgatt taagaagtga
66181 aagtcttaaa atagttttttg ttctcaggag ttgcaggaa acctggatag ttactatttt
66241 ctttatttta caaatccttc ttgagggccc actagatact atgtgctgtt ttagatactg
66301 gaaagtgggt atatttaggc tgagaccgga agtacaagga ggagttaggc caacagcaag
66361 aaagataaaa taaaggctct gaaatgggaa gcagcctggg gtgttctagg gacagagagg
66421 aagccagcat ggttagatcc tgtgttaatc catttgtgtc cctataaagg gttctacagg cttcacatga
66481 actaggtaag ttataaagaa aagaggttta attggttcca gttctacagg cttcacatga
66541 agcatagtgc tggcatttgc ttctgggtgag gcctcaggaa gcttccaatc atgggtggaag
66601 gtgaagggga gccagtacat cacatgacgg gtgcaggagg gtgccacact cttttaaaca
66661 acaaatctca cgtgaaacaa ctgagcgaga actcacttat caccaaggag atgggtggtaa
66721 gccatttatt tatgaggaat ccagccccag gacccaaaca cctcccacca ggccacacct
66781 ccaatattgg ggatcacatt tcaacataag atgtggaggg gacaaacacc caaaccatgt
66841 cagatcccag tgaacaagag aaagaacgtc atgagacggg gttgaagtgt taggtaaggg
66901 ccaagatata tgctttttaag gagttgaaat tttatttgaa atgcagtagg gagcagatga
66961 aggggaagtg gcaagtctct gttaacaggt agggctattc cggctactgt ctggctaattg
67021 gattagagga gtaccagggg gaaagtggga aaccagatag gaggccatct gattacatcc
67081 atccctgctc agatggggggc ggcagcagtg gtgatggaga ggagattgag atgggggtaa
67141 gagaaaagaa gggatcaagc ctgacactaa ggttttggct gtcagaaatg gtaggaaggt
67201 agggtagggc tgtatactga ggtgggaaag atagcgggaa gagcagagaa aatctcagag gatacatcca
67261 ggagaaaatc aagagtctct ttttggatgt gtgaagtctg aagagcctgt gatacatcca
67321 agtggagatg tcgggtgggt ctgaatgcaa gagaagtctg agctgacggg acgaaactgg
67381 ggattatcag ctcataggta acattgacaa ccatgtaagt ggaggagacc acctcatggg
67441 agagtgtgtg atctccaagg tatactaagt gaaaagcaat ttttagagca attcttatag
67501 tacgatccca ttatttgtgt gttcatgcac atacacacac acatatctgt atataaatgc
67561 atagaaaagg tggcagaata atgggtcatc tagaccttag agctgaggag gaaaggacat

```

```

67621 gggaaatggc agcaaaggag gatatttaca tttgctctgt atacagtggg ccaggtggtg
67681 tcatgggtgt ttaatatcca cttatttagt actcatagtt agcctttgag ttaagtgttc
67741 agattatctc tgttttatgg gtgaggaagc tgaggcacag agagataagc aatttgccca
67801 aagttgcaga ggtggttggt ggtagaatgg gatataaatc ccaggtagct ttgctttcag
67861 agcctaactt tgcaagctgt gctaggtgtc agaatgtgag tgtgtctgta tgtatgtgca
67921 catgtgtgtg cacatcatca gagcttgaag atcttggaag gaatatggcc tgtttttcct
67981 tgccctcctt ccctaccacc ctcaggcttt tctctggctt ctcttttata tggggtgagg
68041 gtttcatata gctaattata aggttggtca aatagtgcc cctcttaaga tttttgtgt
68101 aggacaaaat tttggataga cctaagagtg gtttttatta ccctgtaagt aaagcagttc
68161 ttggcacata gtaagcacia gtaaattgct gaattgaatt tgaatgaaca gttagctaat
68221 gacctgggta ggggtgcctc ttggaattgg gggcagccac atctttttgt gccctcgcta
68281 ctccccctac ccccttaact tcctttgttc tccttggtt tgtaaaagt aaaagaagag
68341 aggagctttt tcataaaaatt taataccaag ggtagctcaa agagcccatc tgaaagggtt
68401 ggcagctggg agagtttgtg tggacagcag ccacttctg tttgattgac tctagggagt
68461 gcaacaggtg aattctgtgt ccgtgaatct ggacctgtag cattgtgatt tcttcgtctt
68521 acaggggctt tagtaataga ggagatggcg actgcattgt tactgctcgt tcaaaactga
68581 tcaagaggcc gggcgtagt gctcacgcct gtaatcccag ccctttggga ggccaaggcg
68641 ggcagatagc ttgaggccag gagtttgaga ccagcctgac caacatgggt aaacttcttc
68701 tctactaaaa atgtaaaaaat tagctgggca tggaggctgg tgcctctagt ccagctact
68761 tgggaggccg aggcacagaa acacttgaac ccaggaggca gaggttgtag tgagccaaga
68821 ttgcactact gcactccagc ctgggcgaca gagtgagact gtgtctcaaa aaacaaacaa
68881 caacaaaaaa aactgatcat taatatgagt catacttagt aaatgctgaa gtcttcaaac
68941 tttagaggag taatgatata atccagctaa ttactcttaa taatactgaa aaatcaaact
69001 ataccttaga taaaatgtga ttgaggaaaa acaaccttta ttagttcaaa gccaggcgac
69061 ggggatggca gcagaagggt ctctcagagg gttgctgacc acagttcatt cagctctgaa
69121 aattccctgg cagggacatc tatgaagata agtttttctc tgcaagctta tatacttctg
69181 tactcatttc ttggacctta atatgtaagg tcttcttata ttgaagacct tacatatata
69241 gtggaattga gctgtaaaata tcttagactt gcctctctcc ccataaaaaa tttgccacta
69301 agcttttcat ctctacagt ttgggtcccc tgaggatat gaagcaggcc aactaagatc
69361 tgcatagtga acttttagta tgtatctagt ttgacatttt catcaattga aagtaaaaat
69421 tttgttttat tcttggtgta acattttatt tttgcagaaa tgttctagt ctaatggtgc
69481 ttgaatgtaa gttttccatc attgggttga aaatagggtt gtctagtcca gcgagctcag
69541 tgcagatcat gatgtgtttg tagaaaaagc cctgtggaag agaaatcctc tttcagtaat
69601 attctaggca gtgccagtgt tgttttgttt ctgttcttga attacctca agagggcaac
69661 gaacacttta ttttcagata aaaatttata tatgatttgg gtcttcattg caacacatct
69721 catgaatgcc tcttgagaag taatgaaagt acaatctggg agccataaaa ccataccata
69781 attacactga attctgccaa cacacacttt aaatgttttg ctcttttctc tcagtctcta
69841 tatttttatg agatcatctg gaaaaaaaaa agacctgatt tgtggcgtgt tgttgctttg
69901 ttaaggtaaa gttttactac aaacccctca taatagagtt tgtatttgtt ttgagggaaa
69961 ctttgatatt gaggaataaa tagtctagtt tgtgctatag aactagagac agaaagtatt
70021 ttcaagtgtt ggcataattg tgaaataaaa agcagcccag agaagttgtg gttttgacat
70081 aatgtggccc tcggaaatgt ttggatttga ccttgccctt ctctctcatc ctgcccagag
70141 tctatgagtg aaaactggtt ggtttgccca gcgtagocca ctgctcttag atgtaagggtg
70201 atgaacttca tgtttatatt acttttgttt ttgcttgctg actacataga tgtaaaactga
70261 ctttcattag cttagcaggg ttttttaaag attaatttta aattagggtta aaaatgatgt
70321 attgtgacct atgagtcagc aagcagcatt taagggttaat agtctgttca cgttaggggtc
70381 aagttttact gctgtgttgg ctcagggtgt cctgctatgt tttcataatg tgaacctgat
70441 taaagttttg cttcttaaaa gaataggagt taaggtaaaag aaaagcccca gcaagcagag
70501 cctggttatt atttatggca agctagtagc aagcagtggt ttatatatat tctcgtggat
70561 ggataaattg gaaagttgag tgaacagaga gttcaaggac aaaacaggta tggcttttgt
70621 gaaggctcat taaatcaagc aaagtgttaa tcactcagta ctatcagctg gactgagatt
70681 cttcagtagt ctccagagag caacaattac tgggtgactgt catcgtgtaa caatcaggct
70741 ctggagatga aaaagaccgg tagtgggatc tgagtcaccc attcactaga atgcaaagt
70801 tgccaaataa ctccaacaac cttttaaaat agttttatct ctttttaatc agctttgccc
70861 agaagcagtt ttacattcaa tctttaatgc tccttggtct ttttcacaag atgcaattta
70921 aagggtagtt acccattaaa aagttagtga gtcatacttt ctccctgtgg aattttaaat
70981 tcatttcccg ttccctcctc tccccccg ccgcccccca cgccccatta atgactttag
71041 atcctccaac tatgttctta cctgtctgag aaaagctgaa gtgctaggta atgctaggta
71101 ccaggcccag aagacaattt cgtagacttg cacagctgca acggaagcaa aaggaacct
71161 cagagacctg agagttagtg actgtggccc tgctgcccct ggcgtcattt ctggcaggcc
71221 tcaggacctt ctgcatttct gggctttgac gctgacactg cttatctctc actttttcta
71281 ttgaccattt tactttctct tttggtcacc cagattttcca tacatgggtg ccaggatcct
71341 taacattggc cagagaacat aggatacaat cttagtcaat ttaagagagt tgatatgggt
71401 tttctttcag cattttatatt gaaacaaaaa ttaaacagtt tttagtgagc atccacatac
71461 ccatcaccta gattctacga tacttgcttt atcacatata tgtcagttcc actatccatt
71521 catcagtgct tctcgcgtgt gcttgctgtg tcttttttga tgaatttcat agtaagttgt
71581 atgcttcagt acacttctcc cgggatactt catcatgcat atcactgact agtggtcact
71641 gtctgcagtg tttttctttt gaagtaaaat tacatacagt acaaaacaac ttgtggcggt
71701 ttatatatat atatataat atatatatat atatatatat atatatatat
71761 acacatatat taagtatacc atttgattat ttttgacaaa tgcataatcc tgtgctacaa
71821 agtcctatta agatacagaa tgtcaccgtc atcccagaaa gttcccacat cccacttgcc

```



```

71881 agtaaattcct cccctgcgcc tcccagagggc agccgttctt ctgatttttt tccccatcac
71941 aaattagttt tgtctcttct agaacttcat ataaatggaa ccatatagca tacacttgta
72001 ggctctcttc actgagcata gtattttgag atttatccat gtgttgggtg attcattagt
72061 tgttacctat ttagtgctga gtagtattcc attgtatgca gagatcacag tttgtttacc
72121 atccttctat tgatagacgc ctgagctgtt ttgtttgtgg ccattatgaa taaaacttca
72181 gcgtacgttc ttgtgtaagt ctttttgtgg ctatatgtat ttatttctct tgggggaata
72241 aatagacata gaattgctat gtaagttagt ttttacaaga aaccgccagt cattttccca
72301 aaatggctct actatttgta ctcccaccaa taatgtatga acatttggtt gtaccacatc
72361 ttcaccaaca tatgggtgtag tcactctttt taatttttagc cattctagtg ggcgtataat
72421 ggatctctgt ggtttttagtt tgcttttgcc tgatgactaa tgatgttgaa cactttttta
72481 gtatgtgctt atgctatttg agtatatttc ctttgtgaag tatctattaa aatcttttgc
72541 ccatttttga ttaggtggtt gtatatccta gctgccagtc ctttgtcagc tctatatattt
72601 gcaaacatga aaaccagtc tgtagtttgg ctgtttgtta tgttaatgat atcgtttagc
72661 caaagttttt aattttgata aagtagaatt tagcagttgt tttctttcat ggttattgct
72721 tttctgtatt gtctctaata aaccattgca cgttcccaag gcacaaagat attctcctgt
72781 gttttcttct aattacaggt ttgagcttcc acttacaggt ttatgttcca tcttgaatta
72841 attcttatgt gtaatatgag gtggggatca aggttccctt tccccatat agacagctag
72901 ttgctttaac atcacttctt taaagatttt cttccctat tcggattata tcacaccttt
72961 gttaaaaaatc gaaggactca gtaaattgtg gctgggctct tttctgttcc atcgatctgt
73021 ttttcaatcc ttatgccagt gctacactgt tttgattact gtggcttttt agtgtatctt
73081 gaagtcaagt aatatgagtc ttctaacttt gtaattgttt ttcaaaattg ctttagaaat
73141 tctaggtcct ttgcatctct atgtaaaatt tagaatcagc tggccaatgc tctattaaaa
73201 agtataatgg atttagaatt gtgttaaaac tatagaacaa atggaaagaa ttgacaattt
73261 attgcttctt gcaattcatg aacatagctt atctccttgt atacttaggt ttttaaattc
73321 tcttagcaat cttcattgtt gagattgtat aagccttttg taaacaaatt ctttcaaaat
73381 atttgtatgt gttttggtgc tacagtaaat gaaatgtaaa tttcattttt aaattttatt
73441 attattatta ttattttttt ttttttgaat cggagtcttg ctctgtcggc caggctggaa
73501 tgcagtgcg tgatctcagc tcactgcaac ctgtaccttc tgggctcaag acattctcct
73561 gcctcagcct cccgagtagc tgggattaca ggcattccac accatgcctg gctaattttt
73621 gtatttttag tagagatggg gtttcaccat gttggccagg ctggtctcaa actcccgcc
73681 tcaggtgatc cgcccacttc ggctcccaa agtgctggga ttacaggtgt gagccaccac
73741 gcccggccat aaatttcatt ttttcaaatt tttgctgcta atatataatc atacggttga
73801 tttttatata ttaatgttat gtcataagac cttactaaat tcactactta attctaaaag
73861 ctatttttgt aaatccttta atatttactt cctaaacaat catgtcatct gcaagtacag
73921 tgcattttac ttttcccttt tggatttgta tgcttttctt tctcttgctt tactgcactg
73981 cctaggacct tttcttacag tgtaaacag aagtggtaag agtgggctgc tctgtcttgt
74041 tcccagtgat acagggaaaa cattttttatt tcagtattaa gtccagtgtt gcctgtgggt
74101 tttttatagt tacatgtatt agattgaata agtttattga aagggtttat cattaactca
74161 tttgtctgat gctttctctg catctattta aatggtcata tgattttcct cctttatttg
74221 gtaatatgga tcattttgat ttttttttaa cattaaacct cacatgccta ggataaacc
74281 tattatatca tcactcttac atattgttgg attcaacttg ctaatacttt gtagaggatt
74341 tttgtgtctg tgttcataca ggggtgggtg ctgtaatttt cttttttata attttgttgt
74401 caggatattc ttgttgggtat tagtgtaacg caggcttcac aaaacaagta aggatgttgt
74461 gttccctccc ctgttttctg aaagtgttca tgtaacatga atatgatttc ttccataaac
74521 gtttgctaga actcaccagt gaaactatct agggctggaa ttttctttat gggagggttt
74581 tagatcataa ttcagttcat ttaatagata tagagctatt catattttct gtttcatctg
74641 tgtccatttt aaaaagttac gtttttcaag gaatttgtct gtttcattca ttttgtcaaa
74701 cattttggtg ttatgttgcc ttattaggct tttaacatct gtggaatctt agtgatcacc
74761 cctgtttcaa ccctgatact catcatctgt gttttctctt tttttcttgt ttaccagagt
74821 taggggttta tcaattttgt tgttcttttc aaagaagtag cttttgggtt tatttcctct
74881 actctgtaga cttctgcttt tatttttatt ctactttctt tccgtttaat tgctctctct
74941 tttctagtga ttttaataag tataaaaagct tggccaggcg caatggctca cgcctgtaat
75001 cccagcactt tgggaggtga ggtgggcgga tcacctgagg tcaggagttc gagaccagcc
75061 tggccaacat ggcaaaacc cgtctctact aaaaatacaa aagttagcca tgtgtgggtg
75121 cagcacctg taatcccagc tactggggaa gctgaggcag gagaatcgct tgaacctggg
75181 aggcagaggt tgcagtgagc caagatcacg ccactgccct ccaggctgga taacagagtg
75241 agactccttc tcaaaaaaag agaaaaaag cttggccatc atttttagaca ttttctcaa
75301 agcactgctt tagctgaatc ccacacattt tgatatgggt tattttaatt attattcaat
75361 tcaaaatatt ttttcatacc ctttatatat atgtatttga tccatggaat gtataggaat
75421 ggggtgttta atttccaaat ttccagacaa tgagggtttt cttgatatct tattaatttc
75481 taatttattt tcattttggc cagagaacct actctgtata attttgggtg tttaaaattt
75541 attgagactt gttttgtggc ccagcatatg tggctctctt tgggtgaacat gccatgtgtg
75601 tttgtaaaga atgtgtgttc tcagttgctg ggtgtcatgt tctataaata tcagttaaac
75661 caagatgggt ggtagtagtg ttcaggtaaa ttttgttttt tattcttttg tagttctatc
75721 aattgctaag agattgaaat ctccaagtat gattgaggaa ctctgtacat ctctcttcat
75781 ttatatgat ttttactgaa tgtattttgt aaatctgtta ttaggtacat acacatctat
75841 gattgctgtg ttttctgat gtatgagctt ttcaccattg tgaaattacc tctttatcat
75901 catgagatgt ctttccgcct ccctgggtct gcagtttact tgggtgttaat ttagccgtca
75961 tgtgcttact gtttgccctg tgtattatcc ttttccatac atttgctttc caccatgtt
76021 tctttatctt gaaaatgcat ttctttagac agaagtctac agtaattggc tctttttttt
76081 tttatccatt ttgctcgtgt gtgcctttta attggagtgt ttagtctgtt aacatttgat

```



```

76141 gtaattattg atacatcagt ttaagctgat ggtttgattt atatctgcca gtttaatcat
76201 ctccctcactt tgggttttcag tagccaagaa taatagttgt aatgaatact attatgggtct
76261 aattcctttat aatgtatttt ttctatatcc tttaataagg aatatcttct taagagaaag
76321 gtagaggact ccttatatct agtacaatgc cttaagcata gaattctggt acttaataaa
76381 tgctaagtga atgcggtgga aagaactgtc ccttaagaat caggagacat agtctccaga
76441 cttattttata ttattatttt gcattattac ctggtttaat ccacttattt tgtgtgtgtg
76501 atttagtttc ctcatctata aaaatgagga ggtttaggac tatattatct ctaaaattat
76561 acctttctgt catctatgat ttgaagcttt ctaatgaaga gaatttttat ctaaaagata
76621 tgttcacaag ttattcttca tttagcaacc actttctgac aatcattttc tataatgttt
76681 ttatgtatat aacccttaaa tttcaatgtg gatataatat taaaagaatg caatatctgt
76741 gattcctttt ttcttttcta ttaataatgt gttgctgctg gttctttagc tacacgaggg
76801 gactacaaaa tgatagtttt tgtcagccat gaaaaaaatc aaacctcaaa caaatgtta
76861 taagctgttt ttatatatct taagccctgc cagctaattg gatagggcac aagggtcttt
76921 gattagtctg taagctgcag tgccaccagg ttggtttttc ataggtagta ctcattttta
76981 aatcaaaatt ctgtcgttac ttcattttgt gttgggctg gttaatttat agaacctcat
77041 gatataacca ccaatatcga ggaagcagac ttgactacca tctcaaaaaa agattggggg
77101 taatagttat ttttaaatcc tcaagcacat caaacatcca actcagttaa gtctagagca
77161 tcaactagcag agcattgggc agaacttcaa attttattga ggtattttca agatagggtta
77221 atagttaaga agaggaattt gttcatgggt ctgctgccaa ggagttacac caataactca
77281 aggtgtttatc aacaattcaa acaaatctgg ctgttcaaag aagtgaagta actccactga
77341 cttgtttttg gaccgtagat ggagaagaga ttgtatgttg tgactaacga aaatgaatat
77401 ttcatctctg taccattttt tactgtgcaa tttggtttga acaggttgag tatgaggttg
77461 cagcatgtcc acacagggaa tgttctgtaa gccattcagc aacttgagcc ttgagttctt
77521 gtgagagttt aagcaggact agactcaggc acatccagtt gcagtaagga cagaggtttt
77581 gaaagaggag ctgccacgaa ttatttgtaa tgagaggtgc ccacctctt gataccacag
77641 cttcttgagg tgaaacaaaa gatagtttcc agaagataat aaagagactt taaaatcagt
77701 gtgctatctt cttcccatca gtgtccccct gggtgggccc ttagtgcaag gagacagtaa
77761 taatagatag tgcttctgtc aaaaggctgc tttcttctt ccagaaatag aaacatgctt
77821 cccaagaaat aatctaaatc tatttatatt tctgccactt ctagcttttt gttctgtagt
77881 catttctctt tttttttttt tttttttttt tctgtatgtc ttatcccccc agctagattg
77941 ttaagcatgt ctgggacagg aactattata tttttacttt ctgaagaata cctggcctac
78001 tgctaggcac cttctaaggt taactttttg caagaggaaa gataagcggg agatgtatct
78061 ggaggctgct gttggagtga agagagacct cctatgttcc cagttatgcc taattcattt
78121 attccttctt caaatttgta attttttttt aatcaacgga gaatttttag tgttgaagcc
78181 ttttagcctc tagacatgtt tgagcctgct ggctttcagg ggcttctgt ccagatggag
78241 agacagacat aaccacaaat aacaaggctg actacttgta gtgtgggcag ggtgctggg
78301 aatgggagca ctgagatctc actgagggtg gaggggttct ggaagatgt cattagggga
78361 gaaatgtatt ggagctctgt tttgaaggct ggtagccttt ggtttttgtt tgcttttaaa
78421 ttcctggggt attgtcccat ttctcttcac ccctgctcca caatttttaa aaattctgtc
78481 aacgtaaggt tttgacttaa gctatgcttc acagagaaca tagcatcttt tatagctggt
78541 gccactccta tggcatacag aaaagcgtag gattcaacat aaccccacag tgttgagctg
78601 tacaggctta aaatgaacct gtaataccac aaaaagagca gtggaattgg aatcagagga
78661 tcccttttga gtcttggcct tgtctctcga gaagttgaca gagttgctgc atgccgaaga
78721 acttgtagcc cccaaagagg tatgggagtt gaactaggtta ctgaaggaga gccatgcttt
78781 tggatggctg tctaagtggc acatactgtt ggatagctac cttaaagata cagggggatc
78841 atattaatac caggccataa agtgtcagca cagattgggt gaaagcctgt atgcgcatat
78901 ttgcatatta aagaacagtt atgttgatat atttacatct ctgttaaatt aagaatcaga
78961 tttgggtgaga tgtaggatta gatatagtat caaaaaattt tcatgagaat acagtaagcc
79021 tatgggaaaa attcattgtt ttgtcattca aatttgatac aaatttctgt ttaattgctt
79081 ttcagatgMa aatacaattc tggaaagagg aaatatagt aaagcctttt tataaatata
79141 aaatattttt tcaaaacttg agttgttttt ttcttccacc atttctgttg ctgcaaaagg
79201 taatgacatt tcccgctga ggaaaaacat ttttgaaatt gagttaaatt attatttgag
79261 aataagggtt cttctgttgg cctgtactat attctgatga cttataaaga gacctgtgc
79321 agcagtgtcc tctgtatgtc cttgggtggg cctttgacac tctgcaatag gaagactagc
79381 taataaattt tctcttttct ctacacaaat tccatttgt gcaattgcct cccctctagt
79441 ttttccagat gatgtaagct actattatgc caccacgctt gctaacttaa tggatcact
79501 ttttaagaaat actgcagggt ttttaaaaaat accagttgga Rtgcctcatt ctaggatatt
79561 ctcatttact tttaaaaacg tcatttagag ctttttgctt tctgggggtt tttggtactt
79621 ttttttcaac ctttgtatgg tgtgctttct ccataatata tgaatattta tttttatttg
79681 aaaaatgttt tccctcaaac ccaataattg atgctggagg aagggtgtgt acgtctctcc
79741 tgtggcatca tgtactgtta ctgcgtgcct tagtaccac ctgtttaagR ggcacaggac
79801 ctgatgattc tattgtttca gagaagccaa attagtgttg atcctgtctt aggcaagatt
79861 tgataagatc tgagcccttt ttctgtctca tagttcatct tttagtact ttgaactagt
79921 tgtttacctt tagtcctgtt gcctgtggta atcctaccta aaacctcgcg gaatacagaa
79981 ataaacaatg caaaagagtt caaatgtcca gaatgaaaga tttgagaatt tgttctctag
80041 attgggtgatt cttagctttc ttaattatta ttggcaataa ataagtccgt ttttattgac
80101 aattaagagt gaaagagtga acctcatgga attagttaca aaaattacag aaattttatg
80161 attttttact ttcatgaaag aacaatgaac ttcttcagaa agaaggaaaa taaatgggaa
80221 atttttttta aaggcttctc tcatcctccc cccaaaattg agaacattgt agaagggtgc
80281 actaagaaga atgatggggt tctaagaatt gagagatgtt ggccgggccc agtggctcat
80341 gcccgtaatc ccagcacttt ggggggcccga agcagggtgga tcatttgagg tcaggagtcc

```

80401	gagaccagcc	tggccaacaa	agtgaacccc	cgtctctact	aaaaatacaa	aaaaattagc
80461	tgggtgtggt	ggcacgcacc	tgtaatccta	gctactcggg	aggctgaagc	acaagaaatg
80521	cttgaaccca	ggaggtagag	gttgcagtga	gccaagatcg	cgccactgta	ctacagcctg
80581	ggcaacacag	tgaaactccg	aatcaaaaaa	aaaattgaga	gatgttgaaa	agcagagaag
80641	tctgggggtg	gtccacgctg	agttgtctaa	gcagtgtggt	aactggaata	cagagcaagg
80701	acttttgaagt	caggtggacc	caacttcaga	tcctgactcc	gattttatta	gctctgtgcc
80761	cttgaacatg	ctgtttactc	cctttcagct	tcagtttcat	cacttgtgaa	atggaggtaa
80821	taggacacac	ttcatagagc	tagtgggagg	attcagtact	agagtgtgtg	gcacagagct
80881	tggcccacaa	cagcctctgt	aaatgtgagc	tcctgtcgcc	tcacttcact	agccctgcta
80941	gcaagagact	tactttctctg	cctctttggc	cagcattaag	gccactaact	gagacagcat
81001	gaatctaaag	tgggtgctcg	tactctgata	catgatttta	gtaaaagaca	aaaatgattg
81061	gtaattttgt	aaatcattgc	taagattaat	agactagggtg	aaaaggcttt	tgtgtatata
81121	gaagacattt	catctaaaat	attcctataa	tcattacata	tgccctcccc	cctttttttt
81181	ctttcattta	aaatatagag	tgggaaataa	ataatgtaga	tggttttcac	ttatgtgaaa
81241	aatggttgct	aggaattgaa	aaataggttt	tcacagttga	aatcactgct	ttcaaggaga
81301	ttatggttgc	agcttactgc	aggagaataa	taatgataat	gatgataata	acattactat
81361	gctagctcag	tcacgtcaat	ccttatgaggt	gtagatagtg	tattatcctc	attttgcagt
81421	taaaggaacc	gaagcacaga	ggttaatagc	atccccatgt	gcatagttag	gaagtagcag
81481	agccaggatt	tgaactcagg	cagcctggct	ccagagccta	cactctttac	cactatctca
81541	tactaggagg	acagagagaa	ggcagttttt	tgagacagag	taatgtctta	aaacctgcaa
81601	cagggttaatt	attttagatt	tgctctacag	gtattctgag	agaagcctca	caaagtgtat
81661	tgggaattact	attgaaacca	gaccagatta	ctgcatgaag	cgacatttaa	gtgacatggt
81721	gacctatggc	tgacacaaggc	tggagattgg	ggtgcagagt	gtttatgaag	atgtggctag
81781	agacaccaac	aggtaagatg	gtggcaggtg	atcttgcaca	agtcttcctc	caagttcacc
81841	attttctcta	cattcatacc	cagcctttct	tccttctgac	cactcttagg	gaaagaagta
81901	tgggtattcc	tccttttcag	agttctttct	tctgtctgtg	ttcttaattc	catccctct
81961	ttccctcatt	ttcagtcctt	ctctagtggg	tcttttcocag	cagcctgtaa	acacactcat
82021	ctctctccct	cctcttgtcc	taagcagcct	tgtccatata	gagagcaggg	gagaggactc
82081	ggggtagta	gtttaaagca	ggagagaagg	ccaagaacaa	agaaaagagt	ttgaataaaa
82141	aggacatcag	ggtaatgttt	aagagattca	tttttgtgga	gcaaatacca	actagcaaaa
82201	agtttgggtga	tgccatgggt	gtaaactttg	agaaatttgg	gagtgcgaaga	aaagaaggaa
82261	gtaagagttg	ttagagcttt	attatgttcc	ctctagaagt	atatctttta	gttgaaaaga
82321	aaatacccgc	gaaagggttaa	ctgtataagg	aacttcacag	ttaatgtcta	aattagtggg
82381	gtagggggaga	caattgagag	tttattaggg	agctgagatg	attgaccgag	aattctaacg
82441	gtgggctttg	gaggaaggat	gtgttgagtt	ggatgttaaa	ggccctttta	ttctgtagga
82501	tttgggtagg	tgtgattggg	gttgtgccag	gagaaggaag	caaaggggaa	ctagggaaac
82561	aagcactgat	cagcatctta	gaaacaacca	agaggaatgc	caggccgagg	aggatggaat
82621	tttcccttaa	ggaatagaga	tctgttgaat	attttttagc	atgggggaaga	atctcatgga
82681	tatcatgttt	aattaagaaa	gagtaaccga	ataggatgct	cttatgtggg	aaaaggcttc
82741	aaccagggaa	actgtggagt	gctgtagcct	tcaagggctg	tgctagagag	acagttgtgc
82801	agatggaggg	gaagggggag	ccttctgaag	aatacgacat	ctgagttggg	acttcatgga
82861	agagtctgag	ttgggtcaggt	gcagaagagg	aagattgagg	cagaaagaaa	ataatgaact
82921	cctagagatg	ggagtgccat	agcacatttg	aggaatttgg	agtggcttag	tttgattaga
82981	atgtgaaata	ggagagtgat	aagaggtgag	gctgaaaagc	aggcagaggg	gctgattatt
83041	aggggcctga	ggagtccagg	cagggaggct	ggacatgaat	ctaattggagc	aagccaccag
83101	cacgcataaa	gctacaatgt	gatggagcat	atctgcagct	tagaaagatc	gcttacagtg
83161	taaggggcag	tcagagaaga	gcaagttgga	agggagatca	ggtacgaggc	tgttacagaa
83221	attaagcagg	aaatactgat	gtcctggaaa	gaagtgaatg	gtgggtgattg	gtgactgatt
83281	ggaagtgagg	ataagagaga	atgggaagtc	aaggaggctt	ggagagaatg	tgggtttcat
83341	ttggctacac	taagtttcag	atacctgtag	aatagccaag	tgaaggtttg	ctttagagca
83401	gggctaggca	atagacagtt	cagcagtgat	caaaatgttc	tgtgcctgca	actgagtttt
83461	ccattttaat	tcttctaaat	ataaatttta	ataaccacat	gtgcctagtg	gctgtcattt
83521	taaatagtgc	tgcttttaaag	tattggttat	ttgggtttgg	aattcatgag	agaggcctgg
83581	ccttgtccta	ggaattggga	agtcacagc	aaaaagacat	tagaaattga	agccatggaa
83641	atggttggga	gcattctgag	agagttagat	ggagtctgtg	gtttctagga	tccttctgcc
83701	gtgaatggga	acaccttcgt	ggcagaagga	tagccacaag	acttcagttt	agttgcccaa
83761	aactattggt	aggacttggt	tcctgctgga	ttggctctag	aatgccaagt	taagatgatt
83821	tatccacgtg	accccaaatg	actctgcctt	ctcactaagt	cattctctct	ttctactggt
83881	atttaaggat	cctccaaacc	caccagtga	atctattttg	tatcataggt	ttcactcttc
83941	ctccctgtct	acaaataatt	tcacaagatc	tttaaaggaa	agaacatagc	agcttgctgc
84001	ttctgcatgg	ttttgagctc	attttaattt	ttaatacagg	tatttacatt	cataagctta
84061	ttttgactgg	tgatgctaaa	ccaaataatt	ttaatacaca	ttactttttg	ccatcccaat
84121	gctttacttt	caagacttta	agtagatgtg	taagagaatt	tctgagaaat	atctcagaaa
84181	taaagttatt	tacttccagg	cctcctgaga	gggtggggtg	taaaaaatga	ctttctgaga
84241	tgtcttttcc	cccagccata	tgattttggg	tatggaaact	ctgttacctg	tctcagagat
84301	tgttttcccc	ttgttccttg	tgtttaacttt	gtcaccattt	tatttgtgta	acagatgtta
84361	cacaaatagg	tagtgatttt	cacaggtagt	gattttcttt	ccttaggggc	cacactgtga
84421	aggcagtgtg	tgagtcatth	cacctggcca	aagattccgg	ttttaaagtg	gtggcccata
84481	tgatgcctga	cctgccaaac	gtgggactag	aaagagacat	tgaacagttc	acagtaagtg
84541	tgacttcagc	caggcgcatt	cagaatggct	ctgcatgttt	cttatcccat	ctggctcttg
84601	tgcttgttca	ctgttgatgt	tttccagtg	ttaaagaaatg	catccttatt	atagaatatt


```

84661 agaaacacag tagggtaaga gacatcacc atagcccat cagacaaaac tcttaacatt
84721 ttaatgaatt ctttccaaga tttttctatg cataggtttt ttggggggtg aggttggtta
84781 tgcaaataata acacagacat acaaataat atgacatagg aaattattgt aatagttttt
84841 tcacttaaca ttttaacaag catttatcca tgttgtagcc tggctctctgt taacatgtta
84901 acatatttaa atgtcttttt aatttaatat gtcatacctt gcttaaacc ttgcaagttt
84961 ttcagaattt aagatatact ggttttttaa tattatttaa aaaacactgc aggtaaatga
85021 ctttatgtgt ataatttttt ttagtattta ggtttatctg tttatgataa attccatgga
85081 gtagaattat caggtaaagg tagaaacatt ttaagaatct cactgtatta ataagttgct
85141 ttgcagagag ttataacaat ttatactcat ttcagcagag tttttcttcc caaataattc
85201 tctcctgttt attttctata tatgcttata gatgcatatg cacatatgta catatatttt
85261 actgtttgct agtttgatca ataaaagtgc cattttaact tgcattttga aattgtaata
85321 atacattttt caagtttgta tttactaatt acatttcttt catctttttg gaattgtgtg
85381 tttttatcct ctgactcatt attctattga gataagaata tttttagtat tagtttatat
85441 gaatttttta ggtaaggaga ttatggactc attggttttt atatttgttt taaatatttt
85501 ccttaacctt ttgttgacct tttacttggt cttccattaa gtcgatcttt tttttccttt
85561 tttttttttt tcttcaaagt cctctaagct tagaactgcc tttctgttct ttgaatttta
85621 actctgggtt gttttattgt tgttatttta actctcacag tttcttgatc catgttaact
85681 ttgttggtgg aaatgagatt ggtcaggcct tttgtttttc ttcagattct ccgatagggc
85741 aagtgtgttt taagatgatg acgatattta tcaagtatt tcatctataa aagtactttt
85801 aatttgctct gtttagaaaa atgcagttta ccatgtctta tttgtgaagt taataattct
85861 ttctctcaa gaagtttact tttattattt ttaagctgg tgaactgcac ctgaggacct
85921 gtttatgaga taacattaat tcacagatat ccctcttctg aattcccca caatggatat
85981 gtaatagact gtgagtctag tctctctccc tcagtaacta atagccaggt gctcagacac
86041 caggccaaaa aggcacctga aacacacttt ttattatcat gattattatt attattatta
86101 tactttaagt tctaggggat gtgtgcacaa cgtgcagggt tgttacatag gtatacatgt
86161 gccacgttgg ttggctgcac ccatgaactt gtcatttaca ttaggtattt ctctaattgc
86221 tgtccctccg cctgcccccc accccacgac agggcccggt gtatgatgtt cccaccctg
86281 tgtcccagtg tgaaacacac tgttcttttag cacagctcct agggagacca gtaggatagc
86341 cagaactcat aaagttaag tgctcctgaa aaatatagta tgtttcatac ttaggaagc
86401 catagcaaat agctgagtct cagtacatat tttccttggt gtcttcaaca taaggaatag
86461 ttcagtaata acattgcaag gacaaccttt cttgtaaaaa gatttatttg cttgtttgta
86521 gtctttgcag ggaaactcac agggaatatg agtgatcat atttcttttc taactgcac
86581 ctagtaaaaga gtaacagaag ggagctaaaa tgaaaaatct gagttctttc tagagaagaa
86641 ttctctacaa attaaattgt tttaaaataa ataagtttta gaaattgata agaggcaaac
86701 agctcagtag gaaaatgggc aaaaaacttg aacaagcatt tcacaaaaga gaatttcaa
86761 atagccaata aacctatcaa aaagtctca aagtaattaa tcttcaaaaa agcgaaattt
86821 aaaactacat ttgggtctcag ttttctacag caccttggtc ttgtattgtg gatataattt
86881 atcttttctt atctctctga agaaatttat tacagatttt tttatacat tttatttttc
86941 tgtatgcatt gcctctgttt cctccaagtg ccttttggtt tctttttgtt ttggttggcc
87001 ccttaatgta cttggctttc ccaagttta tgatgatctt caaccagttt cttatgcctt
87061 tttttttttt tccttgagac ggagtctcgc actgtcattc aggttgaggt gcaatggcac
87121 gatcttggtc cactgcaacc tctgcctccc gggttcaagc aattctcctg cctcagcctt
87181 ctgagtagct gggattacag gtgcccacca ccacacctgg ctaatttttt gtatttttag
87241 tagagacggg gtttcacat gttgaccagg ctggtctcga acttctgacc tctgtatccg
87301 cccgcctctg cctcccaaag tgctgggatt acaggcgtga gccactgcgc ctggcctaaa
87361 gcgattcctt atgcttttaa gtagggggt ttgaaaagcc ggatggcaag gcctgtgtgc
87421 ctagcttgca ggcgtgcttc actgaagaat gttcttttag caataagcgc ttctttcttt
87481 atgggattcc taaatgtcag tatcgtgaac tcttacgtag agccatttga ttcattccaga
87541 gatgaactct ccaacttctt gctttgggct gagtggtctg agtatatctc aggaagttgg
87601 ttgctgacat ccagagagta gggcggagag tccaccagtc tatgtgctgg cttttccctg
87661 ttttcagcct tgggtcttcat ctagaccttc ctttgtacct ggaatctcag agcgagagg
87721 ctttccagtt tctccaggga ctaaagtgtt tcatctgcct gttcgggaaa ggctaagggt
87781 taacggataa ttccctctat gtacacactt gatccagtac ccctgttttt atttccatgt
87841 ctctcctcca tcctgccag ttcttggtac ctctgatccg tgagcctttc tggactctg
87901 cagtgtgatt gagcaggcct ttcgttactg tctccttttg ctattttctt tacttgcaaa
87961 gtcattcaca agccttctta gtttctgtct ttgaagaatt ttttgggttc atacttttta
88021 ttcttgcttc ctttcttggt ctctttgttc ttctgggttt gatggagtct cgctctgtca cccaggctgg
88081 tctgttctct tttttttttt tttttcttga gatggagtct cctgggttca agcaattctc
88141 agtgcagtg gacgatcttg gctcactgca acctccgctt cctgggttca agcaattctc
88201 gtgcctcagc ctctcaata gctgggatta cagacgcgca ccaccacgtc cagctaattt
88261 ttgtattttt agtagagatg gggtttcacc atgttagcca ggctgggtct gaactcctga
88321 cctcaggtga tccacctgcc ttggcctccc aacgtgctgg gattacaggt gtgagccact
88381 gcgcctggcc cctgttactt tagtgtggtt ttggagggaa agaaaataaa cactttttta
88441 aattctctag tgtaactgaa aattgagaac caatcaattt tcattctttc caaaggaatg
88501 tatcagcctg tatgtctccg aaacttatta tacaagcacc agaaataact ttctaaatcc
88561 catgttcaaa tgtagattca gactgggtga acaatggctt ccatacgtgc tctttgtggg
88621 atggctgcag aataatttat aaagacctga tgattcttta aaatataaat gttacaggaa
88681 aatcacacaa ttacagaaga agatctctga aactaaatag tacataaaga atacagcatt
88741 taagaacgtg acagatgtca atgagagatg gaaaagtcta ttgttatatt tctttgtaaa
88801 gcaagttaaa caatgaagag ctttggaaga ctaatgtggc aaagataaaa agtatttttc
88861 cagtttacia gatagagccc tgccagctga gtagatactc ccaccaaggt gggagtgaga

```


88921	ggggactgtg	agtcactttt	catttctcca	aaatatatta	tgcaaaacaa	gattagagca
88981	aattatcagt	gcaaagtcac	ggaaaggaga	atgcctgggtg	tctcattgct	acatcccaaa
89041	ataaagaaag	aaagcagcca	gctgggggtga	tgtagtataa	gaaatgactt	gccaaaagta
89101	gttgagttag	atctattgct	cagtgtccag	ataacaaatg	gacaagggtg	agcccaggat
89161	aggaatgggtg	ccagttgggt	tagggacaga	gtagtcatat	ccagggatca	gcaaactttt
89221	cctctaaagg	gccctatagt	aaacattttta	aattttgtaa	gctagatgat	ctctgtcaca
89281	acttttgaaa	tgtaagcaat	taagtatat	ccattattaa	agaaagggtat	actctagagg
89341	tgaaggcaga	cattgaatag	attgtcatgt	gatgataaga	aagaggtaat	actgggttca
89401	gtgggatttt	ttttaagtgg	gacagctagt	atttgaaagt	cagagggggcc	tctctgaaga
89461	agtggcattc	aaactgaaac	ctgaagatta	gctagataaa	gaaaaattga	tgaactttcc
89521	aggcaaagga	aattgccttt	gcaggagtgg	aaaggccaga	tggtgagggg	tggcatgaga
89581	tgagattgtg	caggagacaa	gctggaatgg	tgagggccta	gtgcagtcca	gcacacactt
89641	gctttgcccc	agtgagacta	cagaaacaag	gagtttctgt	tctgtctgta	cgccctacct
89701	ggtcagaagc	aaaggctgcc	ccagggccta	ctgggtgtgc	cagagaagct	gtcaggggtt
89761	gagatttcac	cctcgggtgat	ctctgcataa	ctaattggaga	agtcattttc	tgttctctat
89821	tcacaggagt	tttttgagaa	ccctgctttt	cgtcccgatg	ggctgaaact	ctatcctacc
89881	ctgggtgattc	gtgggaccgg	gctttatgag	ctttggaaat	caggaagata	taagagttac
89941	tctcctagt	acctgggtga	attgggtggct	cggatcctag	ccctcgtgcc	tccatggact
90001	cgagtgtacc	gagtacagag	gtagtgtgtt	atctttttatt	cctaaaatag	ttgggtgacta
90061	gtctgttttac	tattttctcat	ggaaatagtc	tgattttcata	ttgaggggtt	tggatttttc
90121	ttaatggaaa	taagataact	ggaatgctat	ctgtaaata	ggagggatgg	aaatcatagc
90181	atgtctaagc	cactttgcca	ataacgtatt	tatttatcta	cccattcatt	catgagcctg
90241	gagacagagc	catgacggtc	aataggcatg	gtgcttgctt	ccgagcagct	tatgggtctag
90301	ttcagtgttt	cctcttccag	gtctgcttcc	atctagatgc	agtaatgggt	atgagcataa
90361	gaagtgtggc	cgtgtgtgca	atctctgttc	tagagcctct	gaaagaaaaa	gtagcaacaa
90421	tcactcttta	cagatattaa	tgtaaagtgtg	gaggaaagg	gacatatttc	tgatggcttg
90481	aagaaaaacaa	aataatctga	actgctttct	tcctagaaaa	gagaaagtaa	gatctcattt
90541	acaatcagga	accttatcta	cctattttata	cttacatata	tacatacata	tatactggaa
90601	acataacatc	acagaaaaat	tttagaagcc	ataaagttac	ccgtatacct	acaatcctaa
90661	caaagccaat	tcccacacac	acattcccac	caccctgcc	aaaactaccc	aggttccaat
90721	attacaaatg	caaggccaga	aggagactgc	aatgcatta	caatcagctg	ctagagcagg
90781	actccactga	gcacagaaac	tgtgtgactg	atcatgtaaa	gcaatgaaca	ctgaaaacaa
90841	gcYgaattaa	ctacttaagg	agaattatga	aggatataaa	gtaactgact	tgcttgaagg
90901	tcaaaggaca	tttacctgat	acttctgctg	catactgatt	tctcagtttt	aaaatcattg
90961	gccaaactgc	aggatctRaa	ttgcctatat	ggtctctatt	tttaaaaata	cacctaagaa
91021	tactaaggag	attttaatag	aaaaatcaac	tSttgaaatt	gcttgtgtgg	cccttcccct
91081	tgttgttcaa	cccttctgaa	gcaattcagt	ccaaaggaca	ttaggtgggtg	YRgagcagtg
91141	taggtatcca	catgcaggag	gcaggggagcc	acagggtcca	gagcaggggtg	agaaggtcac
91201	tcattcacat	gcaggaggca	gaggcgtgg	gcaggctgat	gaagtcagaa	tgtggcgaaa
91261	agggcattca	ttcccaccaa	gggcagatct	ggtacaggat	gtcagagctg	tacgtcctct
91321	aggggtgggt	tgggggtata	tgcagaagag	gagacagcaa	gaaaagacca	gttacttaca
91381	gggagttgat	ctaatacagca	gatataattaa	ggatactggg	tgctaggttt	tttttgttat
91441	cttagaagtc	aattacaaaa	gttgaaaaag	gagaaaaatta	gtgtgagcac	tgtgggtgtt
91501	tggaacagga	gatagtgggtg	tgaactcatg	gtttccaaca	tataggtaca	tgtagaaata
91561	agtgtaaatg	taatgaataa	caacacaggt	ggcccttcat	atcttcggat	tctgcattct
91621	acaaattcaa	ccaactgcag	atggaaaaata	ttcagaaaaa	acagtgggtg	gttattgcat
91681	ctgtactgaa	catgtataga	tttttttttt	ttgtcattac	tccttaacaa	atacagtata
91741	acaactagtt	atagtactta	cagtgtatta	gatatacaata	aataatctag	aggccaggcg
91801	tggtggctca	cgcttgcaat	cccagcattt	tgggaggccg	aagtgggcgg	attacctgag
91861	gtcaggagtt	cgagaccagc	ctggccaaca	tgggtgaaacc	ctgtctctac	taaaaataca
91921	aaaaatggcc	agacgtgggtg	gcagggtgcct	gtaatcccag	ctactcagga	ggctgaggca
91981	ggagaatcac	ttgaacctgg	gaggcggagg	ttgcagtgag	cagagatcat	gccattgcat
92041	tccaacctgg	gtgacaaaag	tgaaactcca	tctcaaaaaa	aagtaatcta	gaggtgattt
92101	aaagtataca	ggaggatgtg	cataggttat	atgcaaatac	tacaccattt	tatatgaggg
92161	acttgagcat	ccatggattt	tgggtgtctt	gggagtccta	gaaccaatcc	cctttggata
92221	ccgagggaca	actgtacata	ttttgtgtgt	gtgtgtgtgt	gtgtgtgtgt	gtgtgtgtgt
92281	gtgttttata	gcaatcagtg	tacttagttt	ccagtgaagca	cagctgggtt	ctagatcttg
92341	gtctctaaat	gctctccatt	actaaaagga	acctcttgtg	ccagaaagta	aggaagtatt
92401	caaagaagaa	aagggaatct	ggcttaaagg	gctcccattg	gccaaatctg	ggacaatttg
92461	agcatcaaaa	taaatattga	tattaacaga	ttataaccag	ctgaataaaa	taggaatcca
92521	ctagtttata	ccaatattcc	taattaataa	attgtaagtg	tgattcagaa	acataatatt
92581	tgcagtcagt	cttcatcatt	ctcagattcc	ttatttgcaa	attttcctac	tcactaaaat
92641	tcgttttgtga	ctcaaatacca	atactggcat	tttcacagtc	attcttgggc	atgcttagca
92701	gtgaaaaatt	tgagttgccc	agcattgtca	ccagctgagg	tcaaacaggt	ggtgctctgc
92761	cttctcattt	cagcgtcac	actgggagcc	aatgtccttc	ttgcagtcctg	tttcatgcca
92821	tgtttttcaa	agttttgtgc	agttttttga	ggattcggcca	tttagtatgg	cccccaagca
92881	tagtactgaa	gtgctggcta	ttgctcctga	gtgcaggaag	gctgtgacgt	gccttctgga
92941	gagaatacat	gttatgtgaag	ctttgttcag	gcatgagtga	tgtgccattg	gccatgagtt
93001	cagtgttcat	gaatcaacaa	tatatatcag	ataagggtgtg	tttaaacaga	aacacacata
93061	aaacaagggt	atgtattaaa	cagtcgacaa	aaatattgtg	accagggcct	cacgggaacc
93121	taaccttgta	ttttccctaa	gagcaattac	tcagtataca	gtgtaagtgt	gttgggtgaca

```

93181  ctcggtgtag aatgttaact acttattgcc tgctaacaga actagaacca actaccgact
93241  gtacatagtt gcagagtatc tccccacca tacttagcaa ttgcagagtg aaagagaata
93301  acctaatagt gggaaaacct ggcagctgat caaagtgaac attatcagta ataggacaaa
93361  tcacaattct aggctgcctg atagagggtg tgagaacgta gcatcacttc tctgttactc
93421  agccagaact tcacgatctg aatccaatag tcaggagacg ttagacaaaa caaaattgag
93481  aaacattcta aaacataact ggcccgtaat cttcaaaagt atcaggatga agaaaagagt
93541  tctaacttga aggagactac acagacatga caattaaata caatgttctg aactgggtcc
93601  tttggctgta aaggacttta atgggacact ggtgaaactc aaatggggtc taggattaga
93661  cactagtga gcatccatgt taacttcctc attttgatgg ttcttttgtg gttatgtaag
93721  agaatatcct cgtaggaaat atttaaagta ttctcagggc gttgggacat cttatttgca
93781  aattaacttt caaatagttc aggaaaataa ttatttgtac tgcacttggg actttttatg
93841  taactttgtg attgtttcaa aatctaaact aatacactag acaacaaagc tgcagtaaat
93901  agcattcaca gagacaaaag aaaaagacga tttgcatgta taactgactc aagcaaccag
93961  aaagcagtaa agatgcagct tctcagccgc agagcatggc aacagatagc acaaaatagt
94021  tagcaatttc acatccagaa ataccgaaag taacaaggca tggatcccac aggcaatcag
94081  atgaagaatt tgcattttct cccttcggtt tcggcttaaa ttcttttctg ctgtaaccag
94141  tgagtcaaaa gcagcagaga cattgctata ctattaaatg ctttaatttta tagactttta
94201  aataccacta tgcgacatta tcctggccta ccaacaactg agaaaataag gacttgaaga
94261  aaacaagggc agcagaaata gtctctatag gaaaaatgta aaggagtgat gacaggaaga
94321  gtggagaaca cttatatgat acaaccgaaa ggtcatatga taagaaaggc atgacattat
94381  taataagcaa catatgaggc ctgttaagga aacctggctg ttctcagttc ttctgataYg
94441  accccgttac acttatccta tggagaattg gcccatagga gagtccacaa gctctaattt
94501  caggaggccc aactgtcaca tatgtttctc tatcaataca tcacttatgg agcttgtgag
94561  tgaggagtgg tacagggtga tgtaggctta agatttcgaa gtgacactct tacttcacac
94621  Wtaggtgggt ggattaaaat gtaatggaat actgtaaaac aagaggcagt ggtgcaatct
94681  ctttcaaaat gtggaattag taatgtcctc gatgagtctg aggacagttt attttttgaa
94741  gatagtgatg actcagttcc taacacagta aggccattgg tgaagagagt catccagagt
94801  ctagctgtga tgtcagggtt ttatgcttta ggattgataa tgtagttaac

```

LRCH1 genomic sequence (SEQ ID NO: 5)

>13:44917401-45013900

```

1      tcaaattcttc tcaaatttttc cccatcttaa aaactaaacc agttttctct gctttatttg
61     ttttttagtc aactattaat ctttttcttt cttctagccc ccaaacgctt ggagtaagta
121    acttacacct actctttcta ctttctttgc cttctcctta cctctgcagt ttggatgttg
181    ataaactgtc ctagaactac tctctcaaag acagaggatt ttctgtgtcc cccaagtctt
241    tgYctcttgc atttgctatt attgcaggac aaggacagag ctctctctgt tgcaactcca
301    gtaccaaaca ttacctgtga gttagaagcg gttcagcaaa tctttgttga atacagactc
361    tgtggtcttt tcctttcaaa aacttcttgt ccatccatcc ttatgcatgc cctgtgctcc
421    atcctagtcc aagcaccctt tgtcacacct cctatacctg gtaacactat tctggcttgc
481    ttcttcaatt ccaattcatc ctgcagagta tcatttcatt tacatcttcc ttgggactca
541    cccatgactt caatgactat tgctgcaaac tcaatcttct gaattgggat ttttaaaatg
601    taattaatta actgatttat tattatattg attaattata gatgcacaag gtaaaactga
661    acaaacagat atctagagaa agagaagtct ttctctcatc ccattctacc agttttcttt
721    cccataagcc atcactgata gcagtttctt gtccctcctt gcagagactt tctgtgctag
781    acaattgctt cctgattgga ctatggctca ccatcatgcc tggggccctg tcttgaatcc
841    tagccagttg ggctaggggtc ttgtttacct cctgggcatt ctcccattgt gggctgtgcc
901    atacatcccc ccaggcaatg atttatgatt tgcttcaatt ggcatagtct aagatgatcc
961    ttgctcttag aagagtatct gggactccag cggctgtgac cagacatgca ggtaacactc
1021   ccctgtgggt attatgaggt attccaacac tgttcaccct cactgggggt gacttccttt
1081   ctggctcagtc ctctatccca accacgctaa ttctggcttt actctctctg cagcaaccag
1141   aaatcgaaga aagtcctaac tggttttact tttgaactgt ggtgagttgt gctacgtgtt
1201   gacctgatth gccaacagat aaaatgagat gaccatgttc ctttgcttct gcactattgc
1261   ttcactgtct agcaggacct ctcttttagat gtgcactggc caggatttga gaaataactt
1321   ggggcgttag acagctaatt tttaaaccct gtgtatgtga atagtgatag catctgggta
1381   tgggaagctt aacgccattg tagccagagg gcattttctg cttaaactgg agagaacaac
1441   cactctggga gcctctgact agacccta at gacagcctta agttcggaaa atatccctgt
1501   aatgatata ca agagtcttaa aaacggcctc tggggaacat gaaaattact gcttttagttt
1561   gatgcaaagt accttaacta caaataggaa gacttttttg tccttttaaa gtccacctaa
1621   tgaacaacag gcctgaaaag gtacttaaaa tattgatttg gaggtacatt ttgatcagtt
1681   gaactgcgat ataattggcg atcgaaagat gacacatcca tgagagagac taccacagtc
1741   cagggtttct caaagtgtga gccatggata acagtcttgc aagatgagat ttattgggtca
1801   aatatatagg aaaaaactgc agtgaatcat ctttccttct tccatgttca caatgtacat
1861   tagcatatca aggattcaga gaagtgtgtt agtaaaacaa cttctaaact tttaaattaa
1921   ccctttgtct cccaaactta tttggcgaaa aaatgtttta tgcatagtgc ctgttagcag
1981   cctaaagaac taaggttcag agacacacac actggataat gctgcttcag tttattcatg
2041   caagttaaat gatttacggc catgcgatgc acaatgacgt tttggctcag gacagactgt
2101   atggaatgat cgtcccataa gattataata ccaaattttt actgtacttt ttctatattt
2161   agatatgttt agatacccaa atgcatactt accacgggtg tacaattgcc tatagtattc

```



```

2221 agtattgtaa catgctgtac aggctagctg caataggcta taccatatat agcccaggtg
2281 cataatagga tataccatct aggtttgtgt aagtatactc catgatgttc acacaacaag
2341 aaagtcacat gaaatgtact tgtcagaata tatccccatt gttaagagag acatgactat
2401 attaataaac aaataactgg ttctctctaaa taattcacat attcatcata ttacaaacca
2461 ataatacaat atgacctatgt tataaaaccaa taacataata taatgaactg gtgaaacatt
2521 taggtgaacc agttgcaata aagctgtttt ttaatattat ctgttatcta acattttacat
2581 ttgctttttt tttaaagtca ggtattttaa aatcgatttt cttttttttt tgagatggag
2641 tcttgctttg tcaccagggt ggagtgcagt ggcacgatct cggctcactg caatttccgc
2701 ctcccgggtt caagcgattc ccctgcctca gcctcccag tagctgggac tacaggcaca
2761 tgccaccatg cctggctaata tttttttatt ttagtagaga cgggggttca ccatgttggc
2821 caggatggtc tcgatctcct gaccttgtga atccgcctgc cttggcctcc caaagtgtg
2881 ggattacagg tgtgagccac cgcacccgcc ctaaaaatct atttctttat aagttaaagt
2941 cttattagtt gatgcctttt ggtccttatt ttctagttaa ttcacctgga agcctcctaa
3001 acctctggca ggaaccagag ggtttgctac tgctcactga tgttttttcc ttacaactta
3061 cttaaggaga tctcaacctc cttaagccaa aatattcttt tattattatt atttttattt
3121 caatagggtt ttggggaaca ggtgggtgtt ggttacctga ataagttctt tagtgggtgt
3181 ctctgagatt ctgggtgcac catcacctga gcagagcaca ctggacctaa tgtgcagtcc
3241 tttctctctc accacttccc actctttccc ccaagccccc aaagtccatg tatcattcta
3301 ttttttcttt ttttagacag agtctcactc cgtcgcccag gctggagtgc agtgggtgcaa
3361 tctcagctca ctgcaacctc cgtttcccag ttcaagtgat tctcatgcct cagcctcccc
3421 agaagctggg actccaggcg cacgccatca caccagcta atttttgtat ttttagtaga
3481 gatgggggtc caccatgttg gccagactgg tctcaaacctc ctgacctcaa gtgatccgcc
3541 cacttcggcc tccaatgtg ctgggattat gggcgtgaac caccatgacc agctgttgta
3601 tcattcttat ctttttgcac cctcatagct tagctcccac ttataagtga gaacatatga
3661 ttgggttttcc atttttgagt taccaaaata ttcttttcat tacaatcagc ttctaataca
3721 cagtgggtcca aaccaagttt tctcagggtt ttttcaaaat cctattatca ctcataagtt
3781 ctaggtcaga atgttgtctc tccgttatac aattgggttat attatctcat ataatttctt
3841 aaaaagcatt gatttaaaaa caaaaatcac acataaatga aaattgacat ttcataagac
3901 catgtacaca tatttatgaa gacagaacaa ggactaaagt ataggttatt gatttatcaa
3961 gactgctcct ctattgtcat tcagagaatg gtcaagaagc cagcttctct gagaatccta
4021 tcttgaggca tagattctgc agtttcttta ttccgcagga actgctgtag aaaggagtac
4081 ttaataaaag tctccctggc ctaggagcca gaactccacc ttaatctggg agaaaacagg
4141 gaaataaagt ggccagaggc tagtagctac tgctttgttg cttcaagaga aggaagtatg
4201 agcctctatg aaggggttga ggttttttgc tggggacttt ggggcacaga atgtaaaaaa
4261 aaaactgcgt ctggacaata gtcagctatg aagtatttaa aaatgtaaag gggctgggtg
4321 cagtggcttg tgccgtgaat ccagcactt tgggaggccg aggctgggtg attacctgag
4381 gtcaggagtt taagaccagc ctgatcaata tggtgaaacc ccgtctctac taaaatacaa
4441 aatttagccc agcatgggtg tgtgcaactg tagtcccagc taattgggag gctgagacag
4501 gagaattgct tgaacctggg aggcggaggt tgcaagtgagc cgggattgaa ccactgcact
4561 ccagccaggg cgacagagcg agacactgtc ccataaataa ataaataaat aaaggggcca
4621 ggcacagtgg ctcatacctg taatcccagc actttgggga ggccaaggtg agtggatcac
4681 ctgaggtcag gagtttgaaa ccagcctggc taatgtgttg aacctgcac tctactaaaa
4741 ataccaaaaa aaaaaaaaaa aaaaaaaat tagccaggca tgggtggcagg tgcctgtagt
4801 cctaactact cgggaggctg aggcaggaga atcccttgaa catgggaggt ggaggttaca
4861 gtgagactcc atctcaaaaa aaaaaaaaaa aaaaaaaag aaaagaagat tagttgatgt
4921 gagcacagct taagaaaatg cttgaaagca ggtgactaga cttatgtatg actaacttcc
4981 ttttaagaaa accaagggtc tcagcaagta cagtagttcc cagagttttt gatttcagag
5041 ataaacaaca tcaaaataat tggtaactga ctttagtaac ctctttttgt tattttttga
5101 aaaaggatac ttaaaaaaca ctacaattta ttgttaccat tgttttggtt ttttttttcc
5161 atcagaaaaa aaaatagtga aggcacagcc tcacaattat atataatttt tgaaattaaa
5221 tacattcagg ttcatgaaaa actcaggaca ttgtcctatt tttttttcct cattttatca
5281 gggtcatttt ttcatcaact agctgattca catagaaaaa tcctgaaaca catattattt
5341 atcttcagag aaattcatgt tgatgttact agttgcacat aatatctcag ccagacaaca
5401 ttatttggtg aatcttccag gcagcggatt tttttaaaag ggctgatctc ctgcccttaa
5461 tagcaaaagg gtgctgtttt cagaataagt aaacagggtg ttaaacaaaa gagagatgtc
5521 catcttcttg aagaaatagt gaagaagcaa gacagcaagg ggaaatggct tgtcgagttt
5581 ctttaataat tagaaataat caagatcatt ttcaagggtc aagtactctc tcccatttta
5641 agaaaaactc cttcattcag ggaaatcatt tgaaacttta aagatgtatc aacaagtacc
5701 ccataaattt atacaaataa aaaaggacat atcaacagggt ggcaaacctg ttaaacacat
5761 ggtctattat gcaatactta attgattact aatattaatt gtgcactcat tatatacaaa
5821 gtactcccct cgattctgag gcatggggag agagttgcaa agatgaatag gtccctattt
5881 catggaattt acagtttagt aatctgtaga tgggtaaaca aaccacaatg agtaggtcaa
5941 tctaacagag ggactgatca tttgttaaaa agcaaatcgt gggctcatat gcaatccatt
6001 attttcttta aagaagaatt agtggctctt taaaaaaata tgtatgcttc ctatgatgca
6061 tcacaacgac tcttagtctg aactaaattt gcagtcagcc agaagatgtc ccaaatcatg
6121 tcttgactgc tgatcacaca gactaccacc tggtttcagc tgaagattct ttttaattgga
6181 tttttttctg tgtttctgtt tttcactgga ttttgttttt ctctgttctc ctcctggag
6241 gaaagtggaa atttggttac ttttttgtga tggaagtata ctttcattta ttattattgt
6301 cgttattatt atgaattttg aagccggact tttaaaagcc tgggaaggct cggcgaatgg
6361 catgtgagag gggagggttg cgggaggata ccagcagggt gcgcgtgtct cctccgggca
6421 gattagaatg ctttgctcag ggccaagaat cccgcaggaa ttaagggcaa ctatctgtgc

```


6481	agtcaattca	agtgacacag	atcatgccat	acttaagtgc	cgagtccatg	aagtcaccag
6541	ttccagcctg	ttgtctaggc	catcaaactt	atgtattacc	acttaaaaaa	ccagctcccc
6601	tactccaagg	gttgcat tac	tttcgtgctt	gacaccccga	caaccccgcg	cccaccccc
6661	gactcatttt	ccccaaagcca	agtcgctcat	aggggacaa	caagccttaa	gaatagagca
6721	aaaataaagg	ccctggaaag	ttggacatga	agctttaact	tcaggaaagg	aatgggtattc
6781	tattaatcgt	ccagctgggtc	tgcccttagg	gtgtcagatg	ttctctgtcg	cccctgggtgt
6841	gccagcattg	gcctgggtgc	cactgggtgg	ctgatggcag	aatgtgaatt	cacttgcaag
6901	cggacatgtt	cgtttccatg	ccccaaagcg	ggaagaagaa	gggcacaagg	agacttcgat
6961	ggttctttca	gctcagactc	gagctgtgac	tgatttgctg	tttgggggtca	ctggctttct
7021	agcctctcct	ggcaccaccc	aatttcgggg	agcagccagc	tcactcttct	cctacgacaa
7081	tgtcttctgt	ccccataaaa	cactgccttc	atcttgagtt	tttctttcct	atgtctgtag
7141	ctttcttctg	ccgctcagca	aacactctgt	cccactcgta	ttcgtccctt	ggcgctggcg
7201	tctggcccag	gggtacactg	tgaaggagg	caaccctaga	ttctgagggc	cctagctcga
7261	atctagcgcc	cctctaactg	cagggggtgac	cttagataca	tttattaact	tcctctgtag
7321	actcagggga	acaactttgg	cactcctggg	gtccctggat	taatgaggta	acttacgtag
7381	actccctaaa	caagcgtctg	gttcattgta	agcgcccaaa	tgccaggggg	catctgcagg
7441	gatgaccca	tagtgaatga	aaactgcctc	ttggggatct	ctgggttaaa	cggccagaat
7501	aaatcgcaga	attgagagaa	ccctctcctg	ccccaaacct	cactgtactg	taaataccat
7561	tcattgcctc	ccgcggtttt	atccgtgttc	tcagaccacc	cccctatccc	cgcaacctcc
7621	agtcacctaa	agcctcctgg	gcggcaaaaag	gacgcccaga	gagagggtcg	gcgcctcagt
7681	tgccccggag	cagacgtcca	gccccgcctg	gtacccgatt	gcggggcgga	tcgcggcaag
7741	gcggcgggcg	ccggcagaat	aggcgcgagg	gaaggctcag	gcggggcaga	ctgcgtgggg
7801	gaaggaggag	gagagagcag	acggcgggag	agggcagagc	agccgggggg	agggcgcagg
7861	ggcgggagga	gacacatgcg	cgctgccgcc	gccgcccgcg	ccgcgcagct	ccttagcttc
7921	ccggggacag	gaaaccttca	agaccgagct	gccacggccg	cctccccgcc	cgccccccat
7981	tctacgcgcc	tgcccacacc	ctcctccctt	ccttccagcg	cctttcgggtg	gagcactgcg
8041	gcactcagcc	cgagctgcgc	ttttcccttc	gcggggaaacg	ctgtgacccc	cccgcaggag
8101	cggcgggggcg	gggtgggggg	gcccggggaga	agatggcgac	gccgggaagc	gaaccccaac
8161	ctttcgtccc	ggccctttcg	gtagctactc	tgacccactc	tcactatccc	caccaccacc
8221	accaccacca	tcagcaccac	ggaggaaccg	gcgcccccg	cggggcgggt	ggtggcgggcg
8281	gtggcagcgg	gggcttcaac	ctgcccttga	accgggggtct	ggagcgcgcg	cttgaggagg
8341	cggccaactc	cgggggggctg	aacctgagcg	ccaggaaatt	gaaggaattt	ccccgtaccg
8401	cagcccccg	gcacgacctc	tcggacacgg	tgagggcagg	tgagtgaggg	ccgagggggcg
8461	ggcaggggtg	tggtgtctgt	ctgggtgtct	gtcgtgcgtt	ccctaacgcg	gtggacagtc
8521	ggagatcttg	tcttgctggg	ggagggagg	tcctatcgcc	cgttgctctcc	cgaagaaggg
8581	actcgcgtgg	gcgcggaaga	agcgggccc	ggagagggca	cgggggccct	gcctgggtccg
8641	gcgatgcagt	gccaggagg	caggggtgcg	ccgggcctct	gcgcctgaga	gcgaggggtc
8701	tcgggctctc	cacctgtgg	ctgccgcgcc	agggaagtaa	ccgcggggct	gggacttgca
8761	ggcgcgccgc	gtgcgcgcag	tgtaagtggg	aggtttcagg	cggctgtgtc	ggcttcctgg
8821	gccccgcgca	gggctgggaa	ctccagcgcg	gacagcgggc	tcggcgccct	caaccagttc
8881	aagccgtctt	tgcatcgagg	cgtagcccat	cctggtgggg	aaaccagac	aaaggtggca
8941	cgccttcggc	cgagccagg	gcacggcg	agtgccgcga	gccccctcgg	cgacatcgcc
9001	gagcgatcgg	gcaactcgg	gccgcctgtg	agggtgccaa	gtttcctctc	cctgcgcttg
9061	tgcgggaaaa	gagccgcgg	gcttgtagtg	aatcccagtc	ggctgccgct	tcggaagcga
9121	tcggccctct	tccttccgtg	ccttttgctc	accgcccaca	cagtttggtg	cctaccaccg
9181	aggctacctg	gttctcagtt	acccaacctg	tgccggggcc	ccaggaaagg	acggcggtggc
9241	atattaaagg	caaagtaatt	aacgtgagcc	tggttttctg	tgtgagcccc	gcaagttgta
9301	actcgcgcca	ataagcagca	taactttttc	aagttacgtc	atgtgttaca	tacttctaaa
9361	acgtctgctt	tctcttttgt	agttggagtt	ccaggagcgg	gatctataaa	caggaaggag
9421	ggtggtggaa	taggattggg	gccttaggg	ctatacagaa	ctgacttggt	ttccggccat
9481	ccggttccgc	tccttggggg	agggtttgtg	tcatagcaag	cgcccaacat	ttcccagggc
9541	agtgggtgct	ccgttttgga	gccgctgccc	agacctcttg	gctgtcatcg	cctcatggcc
9601	cagggtcaga	ccccctgggt	cttggtatggg	ttgactctca	tcacaggagc	accagttta
9661	atcttgtagt	gggcaaggga	gcaggcagtg	ggtttttgga	ggctagggtt	ccagtgtctt
9721	ttcccccttt	taattcaata	aacattttatc	tagagcctta	atgaatattt	agatacagtt
9781	ctgagttcac	tggaggcaaa	gatggctctc	cagggtcatt	aaactttgta	atttggtatt
9841	agggatagtc	aggaatcggc	aaaaaagagg	gaatttccaa	agttgagctg	tcaacagctg
9901	gggagtgtct	ttcaataaga	cctcttagtt	acatcttctc	aagtggaaact	tattccaaga
9961	attgcctgaa	tcactgactt	aaaaaactac	attaaatttt	acttcccttc	tgctatagag
10021	tgtaccgtga	gctagctatg	ctatgggttg	ctatatctgc	agaaaaataga	gctggcatga
10081	ctaataataa	taggtttgtg	tagttcagta	agggggcttc	atagttgttc	tacttcagtt
10141	atgctaagga	ttatttacaa	agttagggtga	acttgatgtg	tctgctgtgt	tggcatttct
10201	ttgagaaRac	cagtgccttt	agggatcaca	tcttttagct	aagacctcgc	catgtgaagt
10261	ggatgctgaa	agtgttcttg	ttggcttggt	tatggcaagc	ttaaagtgtg	agttttgcag
10321	gtttttatatt	atgagctcac	ttgcacatgt	tttatgctca	ggaaaaatcta	actgggttaa
10381	attcagaggc	tttatgttaa	ttcctcatcc	aaaaatacag	tattattttg	gggaagagga
10441	gtggagggat	attcatgttt	gtagaaactt	aagtcaacc	catcagaaaa	gtattcattg
10501	cagctagtta	ttttacatga	aattagaata	cccaaatgta	ttaaatattt	gcttctgcaa
10561	aacgtctttg	cctcaggtca	aaagctaggt	gtaaaccaca	tgtactcttt	gttctaagaa
10621	taaattttaat	tgagcacagt	ttcttatttg	agagaccaga	aagcaaaata	aagagttaaa
10681	gttacctccg	gtgtacacag	tggtgacaca	gcgtacatgt	aagagttcta	gtacagttga

```

10741 aagtttgagt agtaacattt ataataaaga tagtggtttc tccttgactc atatttactt
10801 taagaatgtc tcttaaaatt agaatggcat atgaagatcc ttaaaggcct aagaggcaaa
10861 gtggattttt ttttccatat attttctaag acagggagtg gtagagcaag ctttttctca
10921 cagttttgtt gtatattaca ggccatttgg tttacgcctt gtaaaaagtc aggcttctgg
10981 cagccacctg tgcagaactg cacctgggca atatagccc tctgaacaga gtggaaaacc
11041 aagatgtaaa caaagaaaca tagaatagat gtctaagctg tcaactcaagt gcatataactt
11101 tattgatagg aaaaaattca agctctcatt ttgagcctat taatttactt ctatttgaat
11161 caaaataagt tttgttgtca gagtctagtc ttttaatagg tgaaacgggg aaagaaagac
11221 tgatccacgc aggtgcagtg agtgacacag gtgtcactga tggaaaggga caaaacagaa
11281 gagccactat cagcactggg tgcgcctctc tatgcgttat ctgcatgac ttagtcccca
11341 ctaggagccc agtcataccc tcatttatac atgggaagac tgagacagag acaagttaca
11401 taatatgctg aagattatac ctctactgag atggtcaacc ggtgattgga accctggcag
11461 cctcacgtta attcatgttc ttgaccatat tctcatcaag cagagggaag gggttgagag
11521 atagaatctg ggaggcttcc tggaaattca ttcaaccagc attgattcca caagaatgta
11581 ctgagccctt ctgagtgtg gccactgatc taggcactgg ggacacaaca gtgacaaaaa
11641 gagaatccct gtatcccttc ttgtggagtt cattctagtt ggagaataga gagatacatg
11701 aataaattga ttttgcagga taaataggat gagttacagg atagatggaa tatctttgtt
11761 ttataaatac acagattgct ttgtattgac ttcagggtggc ttgtagcaag agtataaatg
11821 atgactagta atacatataa tctgaagcat aaaattgggc caaagaaaaa caagtacaca
11881 aatttgcata tgagtaaagc aaattttttt tttttttggt gctgatttat taagtagtgt
11941 cgttttgaat gaagaagttc aaaagggtat tttgtacaat taaaagtga ttgaaaagga
12001 gtaagaaaag aaagtggctg attgcaggag gttctagaaa ataaaaaaga agcccttaga
12061 cttggcatgc aggacacttg ttgaaagtct tgttaaggaa agtggggaat atttcattgc
12121 taattatctt tttgagttgg ctctaagcag gaaagactat gggccaggca ctgtggctca
12181 cacctgtaat cccagcactt tgggaggcct aggtggaagg accacttgac cccaggagtt
12241 tgagaacggt ctgggcaata tagtgagacc ccatctctac gaaaaataaa atattaggcc
12301 aggcacgata gctcactcct gtaacgcctg cactttggga ggccaagggt ggtggatcac
12361 ctgaggtcag gaggtttgaga ccagcctgac caacatggta aaacctcatc tctactgaaa
12421 atacaacat tagccgggca tgggtggcatg tgctgtaat ctcagctact caggaggctg
12481 aggtgggaga atcacttgaa cccaggaggc ggaggttgca gtgagctgag gttgcagtga
12541 gctgaggtcg caccactgca tgccagcctg ggagacagag agagactcca tctcaaaaaa
12601 tgaatgaata aataagtaaa taaaataaaa aattaggcgg gtgtggtggc gcatgcctgt
12661 agttccagct atgcggacgg ctgagggtggg aagcccatag gttgaggctg cagtgaagac
12721 catgatcgcg ccactgcact ccagcctacg tgacagagtg agaccctgcc ttaaacaac
12781 aaacaacaa acaacaacaa caaagactat gtgggaaaca aagagcttac tcagggaaga
12841 atattgaagt gcagcattaa aaatacccat ttatgtgtga gggaagagtt ctgtaggaga
12901 tgcaaagtat aagacaatac aggaatacat gagatgctaa ataacagttc caggaagcca
12961 ctgaggccca aggcagggtca aggtgagggtg ccaagtagca ctgatggaca ttgtgtgtag
13021 aattcagagg aaaagggtcat tttcatgagg atgcttagga aagactttga tagcagaggt
13081 aggatttga tcaggttttg taggatggat aggtattaga tagaagtgcc tatgaatatt
13141 ctgtgattgg aaggatgggt ccaagacgtg gagtaagaac ctgacagttg gccgggtgtg
13201 gtgactcaca cctgtaatcc cagcattttg ggaggctgag ggggtggat cacttgaggc
13261 caggagttca agaccagcct ggccaagacg gtgaaacctt gtgtctacaa aaaaaaaaaa
13321 aaaaaaaaaa aaaagctggg ttctgtaat cccagttact cgggaggctg aggcattgaga
13381 attgcttgaa cctgggaggt gaagggtgtg gtgagccgag gttgcgccac tgcactccag
13441 cctgggagac agaacaagac tctgtctcaa acaacaacaa aaacaatga acctgacagt
13501 ctaagattct gtgaataaaa gaaacagaga gggcatttaa gcctgtcttt ctggtcatat
13561 tcttctaccc aactcctgcc ttataatgga gtaaaggcta cagggtctct atgacctttt
13621 aattgaggac tccggaaatg gctgaagcct aggtttgtc agcctgtggg aataacaccc
13681 tagctctgtg tgatctggct ctctcaaagt tctgtacaga ttcaaaggat cttctctgag
13741 atttgtgggt ggttttatct cttgaaggct gacttccaca ccctattccc atcctaaagc
13801 aatggagtcc ttgggatgtt agcactcttt agtcgttgga attcacagaa gacttgataa
13861 caaaatctag tcattttcaa caacttaact ttatttcata atttttgcca tcaatatgtt
13921 tcaactataa tataataaaa tttttgaaat cacatgtgtt tccttaaaat gtatgttctt
13981 ttatagttat atccagtttt gaattatcgt tctgctattg aattaaattt ggtagttttt
14041 aacatacctg ttgctttttg ttgtgggttac tatcagataa atgcctttgt ttattacatg
14101 tattctaaat attcttccat tcataaacta tgattcataat ctttttcttt cctattacta
14161 ttgttttttc ttccctgtta aggtatagat aaattccaac atcaaacaaa agcttttggg
14221 acaactcaga caatatctgt agtgggtctg aatcacgtct agatgggccc ttccacatgt
14281 ctgtggtata tggcaaaaac agtctccaca aacctacatg ctatttctcat tgcttgcat
14341 acaggctgct ttcttgaaaa ggcaaggaca tactaatcat gcttctagaa taatagcata
14401 caattatagg ccagggaacc tctgggaatt tttggtctgt gccagtttat aaaggaacag
14461 cccaagggtt gaccttcac actgagatga ctctactgga gagtttgtca gtcactgcaa
14521 catctgattt gattttttgt aggtgtttga tactaggcca caaattagca caccctgtca
14581 tttaaaaatt cttgttttaa ttattgactg agactttttt ttgtgtgcgt gtgttactgt
14641 aatgaactga aatttcccat ggcattggcat aataactctt tgtaataaac atttaaaggg
14701 tagatacctt ttgaaatcca tgttgacgtc gattaattca gaagtcaaac ttgttttgcc
14761 cgtgctgtcc atctgggtata tgtacataga ctttttctat tatatcatc aacttcatca
14821 ttgcttgttt aaacacaagc tattttctct ttttgtgtat acatttctgt tccccatat
14881 atatagactt tttatatatt agctgggcag catttacttg ctcttaattg ctccccataa
14941 tttcccttca ggtgtggtac tgcatgtgct ttttcaaagc cttgataatt taaatggcag

```


15001	aaatgctatt	attaactcca	tataagggtgg	ttatggggttt	gtcactcaRg	ccatgtgtaa
15061	cttgaatttt	tgtctaagcc	tcagaaaaaac	ctgttttgtga	ggccactttt	Yagaattttct
15121	tgggcttttt	ggaaaattga	acgtctgtct	tggatattgg	cttgagctta	gatattggcaa
15181	ttccaccagt	gattatttca	gtgatttgtgt	gaattgttag	aattaagata	atttggtgtt
15241	aattgcagtg	attatttcaa	gttataagat	tRtaatctat	tataaaYgtg	ttaaggatgg
15301	aaggcacaaa	acccaactat	ttttcYRtag	tgaataatct	tttttaatgc	ccaactcata
15361	ggaagcctag	cttctgttat	tgctactagt	cttttgtttgc	atgaaagatt	tttggtttttg
15421	catcagaatt	ttgccatgat	atttcagaga	gtaagaaaag	aaaaaaagaa	aagaaaggtc
15481	agggttccaa	gtcagactta	atgtaggaaa	actaggcatt	ctaataataga	ctcaaacatg
15541	aaatatgcct	gtgttattct	tcacccctaat	ttaagagttt	agtgatattg	cttccatatt
15601	ctgcagtaag	aaatagtaca	tttggaacc	atctcctccc	ataaagtaat	tcaaaaaataa
15661	agtgaagattg	tttacctgaa	tagaaagttg	atgaactgtg	agaattgggg	cttcccttgc
15721	ttactccagc	catgcaatag	aagggaatg	cttttatagt	cagatttctg	ttcactgttt
15781	ttcctaacca	tatcctcctt	cactggccat	aaaggaggat	atagctggag	aaaaaaatca
15841	gagaagaaca	gtatgtttga	tttgcataac	agaaatactt	catattttgc	ttggtaagaa
15901	attattgctt	ctctgttaat	atgatgctgg	tgctgaggca	gctcaactga	ctataacctga
15961	aattcttacc	gaacattttt	aagtaatcgg	ggacagggtta	tttgattttg	ggatcttcct
16021	agatgtttgt	ttttcttcct	tctgctgttt	gcttttttcc	ctcagtcctt	ctgctggagg
16081	gggacctaac	acagggtgtg	gatgaaactg	agcaggagcc	ttctagctca	gtgtgtcttg
16141	aatttctctt	ccactgttct	tgccaaatgg	gcagaaagtg	gcccccatct	tagtttttct
16201	aatcttcttg	cttctcatgt	ggacttgctt	ttgacagctg	acccctgcag	tgtggtatgt
16261	atagcttttg	cacacgatgt	gttcctctgt	tattcttccc	tatttttgat	gtttatgcca
16321	tacagcgtga	ggagtagcat	caatatttct	gatctgggtc	agtcagctta	gctctgattt
16381	aactacttta	tctctgcagg	caatgggtggc	aattcaaaga	cagcaccatc	aacacactgc
16441	ttggcttgcc	cttccctctg	attgccttca	ttttgctttt	ccaagtcatt	tacctcatgt
16501	cccttctcct	ccctgttctg	taggattcta	ctgacccac	tctcatttca	tctgggcccc
16561	cagcctgtca	aaacaaacag	cctccctatc	agccctttct	tgcagatgtc	agcactgaat
16621	catacatgac	cttaagccat	ctttgcatta	tttccttatg	gcattttttg	ttttattgcc
16681	ttcctctgat	actttcccta	tgtttaacct	ttttgctcct	tactggcct	gtgagatttg
16741	gctagacggg	acttttccctg	atttttgtat	ggcttccatg	cccaggacag	aaaatgctag
16801	aaaaacattg	atggattact	ctctttcctc	tttcctacac	ttggtctctg	catttttcat
16861	ccatcatctt	ggatctaccc	tgaagttatc	ccctacttgt	gcatagtttg	ctgatctgct
16921	cagattttcc	tgtgagagct	gattttttctc	acatagcctc	tttttacttc	tcagtgtcat
16981	ccactgtatt	agtctgctag	gggcacccatg	acaatattcc	tcagactggg	tggcttaRac
17041	aacagaaatt	aattttccca	tagctctgga	ggctggaagt	ccaagatcaa	ggtgtcggca
17101	ggtttgattc	tcctgaggcc	tctctcttgg	cttacagggtg	gaggttgtct	tcctgggtct
17161	tcacaggccg	ttccttttta	tacacaaatc	cttggtgtcc	cttcctgagc	ccaaatttcc
17221	tcttcttata	agggtatcag	tgagattgga	ttgggaccca	cccataggac	ctcatgtaat
17281	cttcattact	tctttaaaga	ctttgtctct	aaatacagtc	acattctgag	gtgctagggg
17341	ttagtgtctc	cattactttt	gggggtcata	attcagccca	taacgcccac	tgactcacc
17401	ctgctgtagc	tggtagctgg	agttcctccc	ccagcctgtg	taaactgac	ttggacttgt
17461	gtgaggctgc	cctcaatgct	gctcttgac	gaggcccaag	acaggctctg	ttgtaacca
17521	tcctgtcctt	ggaatctagc	cctgcacaca	ctagctacac	ctgcatccac	gctgagagtc
17581	ccaataatgc	tcctgagccc	tcgaatgtgc	tgtaaaatgg	taagagagcc	acataacac
17641	ttacaaatgg	atgactccgg	ctcatctgga	cccctcctcc	atctctcata	gacttagaat
17701	cttttcgggtg	gttgggtgggt	ccctagagtc	acacttttatt	tttagctaag	gtgggggtcac
17761	ttctcaccaa	catttgcaag	tgttcgataa	gcaatgttac	atctaaaatc	aaatgagtta
17821	tagtgaattc	tgaggagat	gggcagggtgt	tttataatat	caaataattgt	ttgaaattag
17881	caaataaaaa	actaatcaat	atcttttgag	cacttattgt	gtaaggagca	tagccaaaaa
17941	tataaaggca	tagttccacc	tagtttgaat	tggatgagga	ttaaagaaat	tatgtatttg
18001	aaagtccctt	acacatacag	tactccaatt	aacaagtatt	atttcaccaa	agcctttcag
18061	cccttagcca	aatggaattt	cttccttttt	tttttaagta	tagcttagtg	attaaaaata
18121	gggtttcctg	agcttcaaag	acctgtgttc	aaatcttggc	cttggtgtct	ataaactatg
18181	tcactttggc	cagatgactt	aaaccctatg	catcggtttc	ctcacctgtc	aaatggagat
18241	aataatagta	tgtacctagt	agagttgtca	tgaggacatt	ggttataata	acaacagcta
18301	acattagcaa	gcagttattc	tatgtcaggt	attgctccaa	gtgctttata	tgcaaatata
18361	tgtattaaat	gtatgtataa	gatgtttcac	ctcatttaat	gcttgctaca	tggtctgtat
18421	taactagagt	gggggctcaa	taactccaag	caatgccttt	ctattgcaac	ctgaagaggg
18481	agattagaaa	tgtagaaacc	atccattcat	atctctccct	catttaatat	ctgaggacac
18541	taaggcccgag	agagtataat	catttggtcca	agggtacaca	gcatggcagt	agggtgccaga
18601	gccagggcag	agtctcccag	gctcacatca	aagggtcggt	tctgtggagc	caggaggtga
18661	cattgggatg	aagggaaggc	tttccctcat	ccataggggt	ctcaggtcaa	accaccccaa
18721	accagccagg	ttgtgggcct	cccaaaaaac	aaaaaaaat	ggtgtgaaac	ctttaataac
18781	agatgggtcca	aacctgggga	gaataagata	aagctaaccg	tagttacaga	tgagacatgt
18841	tagtgtagga	tttgactgca	tgtgggtttga	gggacatgca	caggcctctt	gtcaactgga
18901	ttccacatac	taaaggagtg	tgctgggcag	ccccgcactc	acaaacgggg	ccatcagcct
18961	ttcctagcaa	ggctttgttt	cagaacttgg	catgcatttt	cctataaaaa	caagggtgga
19021	acctgtgatt	tggttctccc	gccaaccac	aaagccctgt	ttaaccctag	cagacctggg
19081	ccttcttatt	aatggtgggt	tcttattgtt	tctttggaaa	aatgcaatcc	cagttccaac
19141	atgaaatccc	gaatctggag	aacttggcat	caggctgtga	atgaggcccc	tgctcttga
19201	aaataattct	ctccccctctg	gccattccgg	ccaggggtcg	gaggttcccc	acacctctcc


```

19261 cagggtccctt gatcaggggca ctcagcgggct gggaaacaag ggttggcata agtcagggat
19321 ccacttggac ctcaggaagg ccactgggccc agggaggaat aggccgggga gccaccacc
19381 tgaggaggc Rtgcaggaac ttagacactt ctctatthaa tttttatatt tcttctgtat
19441 tatctcccca acttactaat tttggaattg gaagcaagtt agtgaacttt tctgaacatc
19501 aggtttgtaa tttgttagaa gogaaaatgc tctttatccc ttgggtgggt gtatagattc
19561 aaagggtaat agatagcaca ggagcagggc tcaggtctgg caaacagtga gtgactagta
19621 gaaaacctgt cactttctgt ccttaatttc catggggcta tgtgacatag tcttcttcag
19681 tcacgtagat aattggaagc tgtcagccta tcattagcat agaggctaaa gcacaaactg
19741 tggctgggtc tttgtccctg ctctgccagg acatggctac tacttcactt cctgagttct
19801 cagtttcctc gtcataaaat ggggataata attatagaat tattgtgagg aacaaatgaa
19861 tacatatgtc aagtgtctag gtcagtgcac ggcactgatt ttgccattat gattattctg
19921 tatctttaga aaagagagtc agtgttataa ggcacagaaa gactaaattc ctagaaatgc
19981 tgtgacatta ataaaaataac atcagtatcc agcaagcttg ggtgtacatg ctttcagtgt
20041 gtgtacatgt tatttatatc ctttcggcag tcttgggagg atggtagcat aggtgggtatt
20101 cattattcca tattgcatgg ggggaaacag gctggatggg gaaatgactt tcttccggtt
20161 atgctgctag tcagcagttg agacaagacc acatcttctg ggttttcatg ctgtttttat
20221 tcttcaattc aacgggtgttc ttaggtttga ttttaatttc gctggggccg ggtgcaatgg
20281 ctcatacctg taatcctagc aatttgggag gccaaaggtg gtaaatcact tgaggccagg
20341 agtttgagac cagcctggcc aatatggtga gaccctctc tactaaaaat acaaaaaatta
20401 gctgggtgtg gtgggtgggca cctgtaatcc aagctactca ggaggctagg gcaagagaat
20461 cgcttgaact gggaggcggg ggttgcagtg agctgagatc acgccattgc actccagcct
20521 gggtgacaga atgagactct gtctccaaaa taataataat aataataata ataataataa
20581 taataatgac aacaataatt tctactggga cagaggagtc ttgaggggac tgagtctcgc
20641 agagaagagt gtgttcaggt ttctcacagt agagaatggg gaaccctatt cctgtgccac
20701 gttgtgtatt caggtgaagg gtgctggggc cagctcttgt tttggcctcc agattggagg
20761 ggtgaggaag tgggtggctgg ggcctcagag gagggcctgg ggtgcctgtc ttcagtctct
20821 acggaagtct tgtcattgat ttaaaagctc ttccaagtta aaaaacaagc aaacaaataa
20881 aaaaccattg acagtctctt catgttcttg gcaaagaaca atttatgaat aattttatgt
20941 tcttgacatg ctctgaagat gaatagcaaa cacttctacc agaagtgaag aaatggctac
21001 taggaggctg agcttttaga ataaatatat agtagattca attgttatct tttttttccc
21061 tcactctttt actggcatcc agcattttat ttgaacttca gtcagaagtt atttactaa
21121 gaaccttgte atagcttcaa catctccctg aggctactga tatggtaact cggagggggg
21181 aataatgttt gtagggccag actcatgtct ggggtccagg tctttcagaa tgttccctct
21241 tcagttctca gaacaccctt gtgaggtcgg gagtatcatc gttactgaga agggcactta
21301 tcacaagtta ggcagtcaga gtatatthgt aagccagtag taagacagag ccgaaattgg
21361 agcccaaaca gttgttgaag aagtgcagga tcctcctcta ttttagtgte actgaatatt
21421 tagagctaga ggaagagacc agagaaggag attttgcaga tgagaatcaa gcctatggca
21481 tttctacaga tggctcctgg ggtgacatag agattttaga gttcatcccc aagtaggacc
21541 cggattcctg actaatgtga tttccccccac tgatctgaaa gtgagctcag agaccccaga
21601 tatatgcatg gggagttcca gccctaatacc tcacttgttt gtgatggcca gctatcagct
21661 ccatttctaa gaattgtgtt ttaaagcaag tcacaattac tRgtttttaa aattcttcaa
21721 ggtatctgtt attaaaaaat atagacacac atttgggttt tcagctttgg tataaacttt
21781 tcttgttaga ctttgtaaca catgacctaa ttgaacagtt tactgatatt ttctataaac
21841 agtttactga tattttacttt cctccagtg agaaatgaac gaatttcatc gagtgcaaga
21901 ccaagtttac tttctagaac attacctata gaatacaaat gtttacattc caaagactgt
21961 tttattatgt aataagaatc atcaatttga catataaaaa tatgttttat tttgtaatag
22021 agatctttct atacattaat tacctctaca attttataga tgaaataggg cagcacaaga
22081 ttatggctaa aaaacagatt ttttttgagt gcatgcaaat caaatccaac ttaaaggaat
22141 ctgtgcaatt gacggcaaat agatctctct ttgtgcagtt cccttggagg tgaaaatgat
22201 aatctctgca tgcaatttaa ggcaattttg tgtgtgtgtg tgtgtgtgtg tgtgtgtgtg
22261 tgttttcctg gtgtttttaga aagcctggat aaatccaagt taatttttag tgtagcagtc
22321 attccatcgg ttataggctt gtaatcaact cttagctgtg gtttgttcag atatttacia
22381 tgaatgcttt cttgtatcta tacagtactg taaaaggtag tgtgctataa Stttataagt
22441 acaaatgtgc cttaatctga tatattttat aaaattcagt tggcagctgt gaaggcttgc
22501 ttttgtctct tcctcccctg cacaggctaa gtccttggaa tcagtatgtt aatgaagact
22561 tggatctca atatgaaatt tgcacctagg gaggtcctgag ataatgcgtc ctgatagagc
22621 ccctaattgc tgccctcttag gagggcgagt gacaaagaca gtataactca gctaagtcct
22681 ttcataatca ggcagccttg gtctttctca agtggttcca tagtttctgt gtgtgtgctt
22741 tcttgtgttt ctgtgtctca gacctcttct ctccttgggc agtctgtctg taatctttta
22801 atactgcatg gtagattgga ttggatgagc cccatcacct ttggataaga aaaggctttt
22861 ggacacaagt ccatgcaaca Ytcttttctt tagagaacac aatagatcac tgggaacatc
22921 ataagaggtg ctctcagagg gtgcttataa gtggcaccat cctaaatcca ggtttaccgg
22981 ggacagtctg ggtttataac tcactctggc ctaatgaata atagcaccct ctttttagcac
23041 agcatgattt agataagttt tatggtcacc ccatgcacat gggatgtggg agataacacc
23101 ttttaagaat aaagtgaat ggattcaagt gaagtgactt acctaccat gtctagtgtt
23161 gtcagattga atccagaatt ggtccagggt atcctgggtc tttcaccagc taccatattt
23221 gctgtccttt gaaggaatta caatgcttgg ctggttctct tttttaactt tcatgccaag
23281 aaaccctctt agtaaaagtct tagacatttg ttgtttatth tagttggtaa aatacagcat
23341 taatttaaaa attacaaaat attgcataca taggaaggag tccgtaccct atgtagacat
23401 gatttaagta atgatgataa aacagacata gtgacagaag catatagaaa ggtgatcacc
23461 tgggaagggg tgcagagagg atggaaacat tctatgtctt agaattggtga gtacataggt

```

23521 aggtgtatgt atttgtcaga actcagtga ctctgcactt aaaatgggtg cattttactg
 23581 tatgtaaatc ataccttgat acagtagact aaaaatttac ctatttacca ctatccaact
 23641 taaaaaggag aacattttcca ataccttttt agctttctgc ctggtgccga ttcttgactg
 23701 acaagctgtt ttaaaacaca gaataactga ggctttattg ctaaatacat gcctcctatt
 23761 agaagactga tattttctgtt ttagtggacg ttctttaatc tttattttcc ttattttcga
 23821 acgtcttggt aaccctcttt acgtagtctt actcataaaa tattctaatt ctgtatttaa
 23881 caagcggcat tttatttttag tgatagaaaa aactgtggct gaaccaagtt ttctgggatc
 23941 actggaatga tgttagctaa tggagtccaa tgttgaaagc atttgttgcg cacctactgg
 24001 atgtcagaca ctttgcagac acgatcttat ttctcctctg agcctaataa taggtatcat
 24061 ttccctttaa tttcctcatg tgtagaattg aggcctatag atgttaagaa cttgcccaag
 24121 atcccatgac aaaagtaatt aggagaatta ggagtcaggg tttagagccc agggatctaa
 24181 gtacattgtt aatgtagaga actgcccttt gctgggagaa gttaagcact tggctggctc
 24241 ccctgggtgt atcgtgtagc accaggacca tgtggcgtat cacttccaaa tttcctaaat
 24301 cactgtgatc ctgcatactc cttgcccaga cccctcctgt ggctctctcc tgcttgccca
 24361 ccgaggctca gctgcctagc agcagatcca cagggcctct ggtatctggc gccaacccgc
 24421 ttatcctgct gggttttcct ctagtctccc tcaaggccct gtgtggctcc agctgccttt
 24481 tccattagtg ttcccatatg ttccaggtta aggcctccgc tttgccttcg attgtacctt
 24541 ttctgtcttc attgcacttg ccaaataaaa taaacaaaac aaaacaatga cagaccccag
 24601 ctctccagtc cctgtcaagc agtcatctca aaattttaat tcctgcctct tctaggatgc
 24661 cccaaatgcc agcctccctc tctgcaactc tactcatctt ttcattctaa acagagttaa
 24721 taatgattga gttgggtcctt aattgttctt taattccatg tcttttttct ctaataagaa
 24781 taagaatgat aatagcttca tttattgagt cagatattgt gttctccact ttatgtggct
 24841 tccctcagct aactcccaga gcaatcttgg gaggttaagta cacattttct tcccatctga
 24901 cagactggaa aattgaggct cagagagaaa tgcctgagat cacatggcta ctaagtggca
 24961 agactgggat tcggtttgac ttgagtttga ctactctttg ctgacttctt gcaaatgcct
 25021 tgaggagagt agaaaagaaa ggaaactgac attgactgtg cctttgctat ggcttggcat
 25081 cgagatgggt tagcttatta tctcacaggg tccttatcct gtgctaagaa tcagatctcc
 25141 aaaaaaattg agaattagat ctctaaaaaa cggaggctct gttacataa ttcattcaag
 25201 gtcacagcgc tgattagtgg agagataaaa attaaaccag gtctttctgc ccctagagat
 25261 gctccactgc gtgcatgagg acactttatt tctttttctt actctctgca tggcctagca
 25321 tagagctgga tattaggga acttttcaat tagttatagg ttgcttaaaa aacaacaaaa
 25381 acaaaagtgc cttttattct gttagaagca tgagcatatc acacatattc cggtagggaa
 25441 gagtagtacc ataaagaatg ttggattttt agaagagaca acgtaaaagc aaagggtgagg
 25501 tgagatagac acttgaacag aatggcagtc acagaatttc ttatcttttg agagatttac
 25561 ttgagggatt ctacctttac tatagtagag gagtgtctaa aattaaaaga caggagaaga
 25621 tgacttagta ttcccatcca gattttttaa ttgctgtgtg gttagctgtc tccagtcagg
 25681 cagcttcaact gctcctttct ttaactgcct ttctcaggca tagaagtaaa aagaagtaaa
 25741 aggtaacggc cagttgccct cggcctctcc attggtggat ttgcagagtg ctgaaattca
 25801 ccctagagtt tacccttcaa agtaactagg cattaaaaaa ctcatacctc caaaaaagga
 25861 actcctttgt gttccaacaa ttgttacaat atgttagact tttgggtgatc aaaacacacc
 25921 tccattaact gctccagcat cttgtgcatc tcagctgttt gtgcgagtca tccagcatga
 25981 gggaggatgg gtctgcatca ggtgcagttc ctgggccttg gaatatgtcc tccacttttg
 26041 tttgatcagc ggcgtgtttc cattgagtg gctgtgtgcc aagagaacag ttgtcagtgg
 26101 tattcgcagt gatgcacatt agcatgagtg ccagagattc aagtggcgac gagtaccac
 26161 tctgccttcc acccattgct ttttgtgtc tcagaaactg gagaaacgct agctttgcac
 26221 actgggtttt ctggaagcgg gctaggcgta tcattttcaa gggctgtgga gcttccctgga
 26281 actgtgcatg ctgtgaacac tctcccagaa tgatgaaatg ccaaagtgtc caagtcacca
 26341 tgcctttgtt cactggctcc catgcctttc ttgctgtgac catccatgag gcttagaacc
 26401 atcacagctg tttaggaaat ggtccttgag tccaacagac caaggtcaaa ttctggctct
 26461 gtcacttagc agttgggtga ctgtaggcaa ttcatgtacc tctctgaact tctcatttct
 26521 catctgtaaa gtaagtga gtaataacac ttatgggggt gctgtgatga ctaaaataac
 26581 aaatttctaag tatgtggcac ttgggggtatg tgtgtgtgag agagagagag aaagagcggg
 26641 agggaggag ggagagagag agagagacag gcaggcagtg gctgtttttt tgaacggcga
 26701 tgcccacaga gggggagtta tttttggaga ggaggggggtc ttctcactgc tcccaattct
 26761 catccatgct ggggacgtgc atctgtctct gccactactc tgggaacata tctcttgcg
 26821 gatacagctg tctttctgtt gttcccttgg tctgccagca cagggtgag gccattccct
 26881 gcactcctct tctacttgt acccccactg caggccatgc ctggggactc cctgaccctg
 26941 ctgtccttct cagcttggag cttgctgtctc tttatgggga ggactttggt tctctttgcc
 27001 aggctgcctg agaaacaggc ccagggtgtg tgaagtaata atccccagac caaatatgtt
 27061 tatcgtctta tttgagccat cctgagactt actgcaacac tactttaagc ttagtgagtt
 27121 taatttggat cacagcctat tatacatatg gcatgggtgc agcttttagt aaaagataaa
 27181 ataggtgcgt gaaatgaaag agacatagat gccagttgga gaacagagt atctaaaagc
 27241 aaattctgca tagcaatat aatacttcag agtgagacag ggtatagttt gaaagaagct
 27301 acctataacg actgttttca ttatatgtac taaagaaaaa aaaagctcga caaatctcc
 27361 ctaactcgtg gagtcatatg gaagatagaa taagaagaca gtgcacaatt gtgggcaaaa
 27421 gaaggtaatg aaacattgca aagactttaa aaagcttttt ttaagtctta tattcacagc
 27481 cacatttctg aaacttaaga ggtgctgcat tttttttcat tcattcatcc atccagcaaa
 27541 tatttattat ctagtgtgag taaacttgcc catgagccca tccctttcca ctgctgtta
 27601 ctgtatgtga caaggatagt agcgtgctca gtagcttgca accacgttgc ctgggtgagc
 27661 gactcctcca tctactggcc cagtgcctt gggcaagttc cataacctct ctatgctcta
 27721 gtttccctcat ctgtaaaaga gaaWtgataa tagcacctgt cacagagggc tttggggaat

27781	tgaaaatgca	aggagtgcag	agcaatgcct	ggcatctgag	agacattcaa	tacatgttaa
27841	ctcttatcat	ttgttttctg	acttattcat	ttgcttcttt	attgtcactc	tctctttcca
27901	tcattaaacg	ctgagagaaa	ccttgttttc	tcttttctca	tgtaactact	atccttggtt
27961	cctaggacag	tgtctgcca	tggtagcagc	ttagtaaata	tttgagccga	gtaagtgaat
28021	aaatggctgg	atgaatgaat	ggaatgcag	aaggctggac	tctgtgctgg	gtgcttccta
28081	gacaggagt	aacaaaactt	ggtgcctgct	gggtatatgc	ccaaaggaaa	gaaaatcagt
28141	acagcaaaga	gatatactgca	cccccatggt	tggtgcagca	ctggtgacaa	tagccaagat
28201	ttgaaagcat	cctaagtgtc	catcaacaga	tgaatggata	aagaaaatgt	ggtacatatg
28261	cacaatggag	tactattcag	ccataaaaag	aatgagatcc	tgtcatttgc	aaccacatgg
28321	atagaactgg	acatcattat	attaagtga	ataagccggg	cacagaaaga	caaacttcgc
28381	atgttctcac	ttattttag	gagctaaaaa	ttaaaacagt	tgaactcatg	gacatagaca
28441	tagagagtag	aatgatgggt	accagaggat	gggaagtggg	gggatgggaa	ggaggtgggg
28501	atgggttaata	ggtatgaaaa	atagaatgaa	tgaaggaaaca	agatctagta	tatgatagca
28561	caacaggggtg	actatagtca	aatatatata	tatatatata	tatttttttt	ttttttgaga
28621	tggagtctta	ctctattccc	cagactggag	cgcagtggca	tgatctcagc	tcactgcaac
28681	ctccacctgc	ctcgttcaag	cctcccaagt	agctgggatt	acaggcacac	accacctatgc
28741	ccggctaatt	tttgtatttt	tagtagagac	ggggtttcgc	catgttggcc	aggctggctc
28801	cgaactcctg	acctcacctc	aggtgatccg	cctgcctcgg	cctcccaaag	tgctggaatt
28861	acaggccact	gtgcctgacc	atatagtcaa	taataatttt	attgtaattt	aaatataatt
28921	ttacagtaac	ctaaagagta	taattatcct	ttgtaacaca	aaggataaat	gcttgaaatg
28981	atggataccc	atztatcctg	atgtgattat	tgcattgcctg	tatgaaagta	tctcatgtac
29041	cccataaata	tatataccta	ctatgtaccc	ccagaaatta	aaaattaaaa	aaaattaaca
29101	ttaaaaaata	caaaacaagt	ggtgttgcct	gcatttttaga	gcttccagct	agtcaagtga
29161	aggagaagtc	tagagatcta	taataaccaa	aggtgctaag	tgtcaatgca	agggaagaac
29221	ggggacacca	tgctgtatgg	catcaaggaa	gaagtggcat	tttccgacta	tggtgagtgg
29281	tggactgata	aacaagagca	ctttttttct	ttatccatta	gaagacttaa	aataattatt
29341	tgtagatccc	acttccccac	tttttaaagc	atttccttct	caattattcc	ctctcttcaa
29401	acatacaaac	ttatacgcac	attctaaaac	ttgtaaaagg	aagttaaaca	cattttaatc
29461	attttaaagg	tttttttaaaa	agtcaaccca	tgtaaacttaa	aatgattat	gaagcacttg
29521	tttactttcg	gttgtctggc	atttatttgt	gtgtgggggt	tttttttttt	tttttttttt
29581	ttgggtgtatg	ggctatttat	tgctttttct	taattttttc	cttgtgtgtt	tggaagcaa
29641	aatccaaaca	aagtcctttt	tggcagtggt	aataataaat	attctgttta	gcctttggat
29701	gaggtttaca	tgatgtatct	ataagcacat	tctggaatat	tggaataaca	gtttccaatc
29761	cttttgatca	atggatagtg	ggataaatga	aaagtcccaa	ccaaaatata	cctactggac
29821	aagaaccatc	atctttttaat	aggcagaaat	cctcttttagg	gtccagcctt	cctttcattc
29881	ctgttctaca	ttgtcaatga	ctctgaccac	aggaacagag	aactgctgga	taggggtgcag
29941	tgctgctggg	cccctctatc	atcaccagca	caaataattg	tattaatttt	tttttttagga
30001	gtggagttaa	agctcagctg	tgcaccccag	acattgatga	agatagtcta	tcgtatgact
30061	tagagtcaca	gaaccacaag	atgcgtgtgt	gattatctaa	ataaagagct	cttactgcaa
30121	ccttgtgact	ctgggtgatag	aactgggctg	gggagggctt	tctcattcat	gtgctgtgca
30181	cacaaatgat	tctctaagtt	gaaggacaca	ttgctctgca	gcataactga	aaaatctgtg
30241	catgaatgtg	tgtgtgtgtg	tgtgtgtgtg	tgtgtgtgtg	ttgtgggggg	gatgtggtct
30301	cattcctact	tgcaaaaatc	ctccagaagg	ggttttcaaa	gcattgcaca	gctgttgctt
30361	gtcagcttct	tgtgttgact	agatgtcagc	aacacttcct	caactttgga	caatgacttg
30421	aaagcaagat	cagtgtgtgc	tcattgggatg	gatttaaatg	gaattgaatg	atacagaaac
30481	cattgcctaa	tttatattta	ggtaagtcat	gttttctttc	tctctctctt	taaatttttc
30541	ctgaaatgca	tgtatgaagc	tctttttggc	taaaatgaga	gaatgaagca	ggctcctgag
30601	tccttgagt	aagaggatcc	attgagaagt	ccagagggag	agagaatgag	cttgattaac
30661	ggcagcacag	gattggcagg	agtataataa	aatagtacat	catctcagag	tgacctataa
30721	ctcgactttg	gaatgcattt	ttatttttgg	cagtggattt	acctccctgt	gtcctgcctg
30781	gacaaacggt	ggaattagtc	agcatttcct	aagcacatgc	tgattatggc	caaagaaagt
30841	ggcaggcttg	aggcttgctg	gcgaccagga	gaaagccagc	tggattagac	atttgccgtg
30901	agccttttgt	tcatgtaact	tatggggcag	tctcctaagc	cagagaaaca	agaaactcaa
30961	aggcagtttt	agcaagggtt	tcattgcattg	cagcataatt	taataactaa	gctcccttta
31021	ggcaggccct	aaataagaat	gtcttggtct	aatttttttc	cgtagactta	agattgttgg
31081	gaaaaaactt	gttagaattc	ccaagtga	ccattttaa	gccttggctt	ctgataactg
31141	ggagtcctga	gtgaagtgtg	cagttgctgc	tgaactcagc	agaaataatt	gcgctcccta
31201	tgccaatgat	ctgtgcatat	tttgagacca	ttctgagacc	aaggaggcta	tcacaacatg
31261	ttcacattgc	tatcgttgat	tagagccctg	agctttacat	gttgtctcct	gtgggtgtcct
31321	tcggaatatt	ggagagccat	gcctctttcc	tttcaatgtt	ctcaacctgg	cccagccagg
31381	attagaggct	cccttctgag	gttcagtaga	attttatatt	taccttttat	cattattcac
31441	cttactgtat	tgcacttctc	tgtctacagt	ctccagcatt	ccattacagt	gctaggacta
31501	tggttggcatt	tgtattcgtt	tttcattact	tcataagaaa	ttgccccaaa	tttgggtggct
31561	taaaatgatg	cacatttatg	atggcacagt	ttctatggat	caggagtcca	gacacagttt
31621	ggctggattc	tctgccctag	gtctcacaag	gctgtactca	aggaactggc	tggggcttct
31681	ctcatctgaa	gcttggagtc	cttttccaag	cttttcgaggt	tgttggcagg	attcgggtccc
31741	ttgtgattgt	ggaactcatg	gtggcctttt	ttctttcagg	ccagcaggaa	aaggtctctg
31801	acttgagggt	gggccccagt	ccttctttta	ttttattatt	attttttgag	acagagtttc
31861	gttcttgttg	cccaggctga	gtgcaacctc	ggtgccatct	cggctcactg	caacctccac
31921	ctccagagtt	caaatgatcc	tcccacctca	gcctcccaag	tagctaggat	tacaggcaca
31981	cgccaccatg	cctggcta	ttttgtatct	tttagtagag	atgggatttc	accatgttgg


```

32041 ccaggctggt ctggaactcc tgacctcaag tgatccaccc acctcggcct cccaaagtgc
32101 tgggattaca ggtatgagcc actgcacctg gccccagtt cttcttttaa aggcattacc
32161 taattaggtc agggccactc aacagttgat taaccttaat tataatttgc aaatcccttt
32221 gccatttaag atgacacaat aattggaatg atatcccatc atattcacag gtcctacctt
32281 tactcaaaaag gtggtagggt atacagggtg gatatagtgt tgaaagaagg aatgaatgaa
32341 atgaatgaat tctgatagct ggaagcacag caactagctt tttttgtagc atgagtgaga
32401 gaaggatttg agttccttat tgaagaatgc agttgcaaca gtttatcact agtgagctgc
32461 ttcttggtta ctataagaca taagcagaca agaaacagca agaaaggaag gaaggagaaa
32521 agagaacgag aaggaaatca ttatttttga ccgatttccg gtgRtggttt caagaagtcc
32581 tccccaccct ccagactgct gtcatttaca attgctagag aacaagagct gggagcctct
32641 ccttggttct gctcctgtgg catagccatg ggggatgcag aagggcagtg gtgcccMta
32701 aagggaaatcc ccgtcagctt tggttttagt ttccagagat tgagcctctg ccttaggctg
32761 agagaaaaac ttagtggtgag tctttatttg ctcccttata atcacaggca catgtggcac
32821 ctctccccc atctctgccc cacctcttcc aacagtgaga tgcattaggt gtggaaagga
32881 agccttcatt tcaaaatctc ctggctgctg ttagctttta aaatcaaatg gaactgtggt
32941 cgtctgtgtt taattttgaa gagcagaaag gatgcgtgct ttgtggcgcc tgcatagtga
33001 aagtctccat gacttaatac cactgccag ccttagaagc ttcccatgca gacaatggcc
33061 ctgcttcccc atcagttctt gggcttgggt gccaccttat ataMacattg ctgcttttag
33121 tgcacgcag aagcaaaagg atgacacatt aatagcagct ggaggatctc attaaaattc
33181 Rgaggaaaat atgaaggctg gagcctggta atgtacagac agtaagtctt tgtctgtctg
33241 attacaatt gcatgYattc taagtgcctt gctggatggt aagaaccagc atttcagcca
33301 gaagtaccat gttcttctcc ttaagaataa cctatttctg tttttcaatt ccttatccc
33361 ctctaaaaat aatatgctgg tcttttgac tcccttgaga actgaaacag cttagcaact
33421 ggggcagtc ctgagagctg gtgcagaaac aactgttgct agcttggtt tgaattatgc
33481 agtcagatgc ttacatcgtg ggagggggat gtacgggggt tgtggccttc agatgcttac
33541 atYgtgggag ggggatgtac aggggtgtgt gccttcatgc cagaaaggac agggaagcac
33601 tccctgggtg gcgggaggag gggagatgct ggggttgagg cccttacctt tatttatgtt
33661 gttcactggt acagccagac tgcaacctct caactcttca gacaagacct aaggccgaca
33721 aaattcactc cctcatgaag aacattgggc tgtttctccc tgggtgtgtg gtggtgggag
33781 tgaagtagag gggctcgtg tgtgcaggga aagggtgca ttctcaagaa tttgtatgta
33841 gcccttgga ctaaaaacaaa atattccaaa ggaatgcttc ttttggaacc ctggtccagt
33901 ccctcgtcta agcaggagtg cccttatatg cttgactgtg gatggcatct gattacgggc
33961 agaaggttgc actggattgc tgcctgatgc ggaccacag aacacagttt aactctggct
34021 ctgtcagcag tcatcagtg ttatttttcc aactcttcag agagatatta gtcgttatga
34081 aaagtgtacc atctcagaac tccatggaat aagctgccaa tataagacag gttgaaatta
34141 ttgtgtcttt ttgcttagag ttatttttag ttatttttcc ttccttgga tttcttttct
34201 tttttttttt taaccatata tgctaacttt gtagctgggt gcaaaaaaag attattttcc
34261 ctatattaat gacttcttca gctgaattga ggaatagggt taccagctct tttcttgga
34321 tttaacactc tcaatctgat aatatgaata acacctcaat aaccacaaca agagcggatc
34381 atcttcagta tctttcctga attacctttt ggcttttcac caccttggtt gtccttctca
34441 gagtttgtct ttctgtaaaa tcatgggaag gcatctgatt actttgttct tgatgtacct
34501 gagtaatgcy aacatctgaa taattgaaca aaaatcttgt ttaaacaaaa cttttgtttc
34561 agaagcatct gtcaaattgt tagtcatctg acaatttaaa atgtcaaagc aagagttggc
34621 tgatcttaac cttagccttg tcacattatt aacttcatgg agcttcagag taacttgaga
34681 agacttgca tctgtacctg aaaaagccag gtttagaaag tggctcatga agaagtaaaa
34741 cctctcagtc aagtggaatg tgcaaggga cccctaggag cattttgga tgaacatttc
34801 ttttgagtgt ctagcccaag acctctttat aacatttggt cctctcccag gtcctcctcc
34861 tactgcctct aattttttaa taagtctgt ttaactcatt tttggataat aagctagctc
34921 tgagaaagct tggtagaact attttctact aaggagtctt aaaactgatc atatctcttg
34981 tcatcaaatt ataacctgac tgttgctgt tatctgaaat tctaagatag tgaagagagt
35041 tatttttact tttctgttag ggcccttctg tcattacttc cttgctagaa tcctatgtgt
35101 gataatgagg gaatgaaatt atccaaaggg taatttgca tatgcatcct acccagcagt
35161 tgaaactact gcagcgaac tgcaaggaaa cctaaccat gttttcttgt aatgctacct
35221 tttgggggtc atgcatgctg ctttctgctc caacagtctt aacgtgggaa ttggggacac
35281 ttactttttg acctggaaca aatctctaag actcgtaagc caccaattga ttcacctttt
35341 gtagcagggc ttgtatgaca aactcttttg tgagaacaaa aggaaagtcc cttccctttt
35401 tgccatttct gttctgtaga ttaattagca aagacgtagt ggagaaatgt gtcacttgca
35461 agacatttct ggcacggagt ggaccaagt gaaatgctta aatgtgttgc agggatatca
35521 aagggactga gcttttgga caaagaggaa cagagcccaa aggacaRttg gtacaaatta
35581 cacaattttc agttggttct aataaagttc taggaaaagg ggcttatgca caaaggctga
35641 gctcttgct ctgttggtct tcaaatccaa aatgtcatta aaatactagt agtggtgtc
35701 atattttaat aacatttttg atttgaagt tgtagctgaa acttactctt tgttaatgga
35761 tgtatcactg ggtgagcttc tagactgct caccaatgga tctagcatta ccttggttaa
35821 tgaaataagg taaaacacag tccctgtgta ccagaaagca ggttcatgtg tcagctgcat
35881 catgtcattt ggaactttgc aggtgtggt ttcttttgct ccttcaatct cctcatttct
35941 ttcattgcct ggatgaagcc cctgcaacag gagagctttt gcctcctctg cctcacctca
36001 gccccctaga cctctgtgtg caactggagt atggtgttaa gtgagcctgg agcagctta
36061 ggaaaaggct tcaagtgagg ctaggtggga aggcctggga cagaaataaa ttcaaaacaa
36121 caaccaaaga actgataggt ggaataaaag aagtgggaca gaaaagattc aaaggtggga
36181 attgaaagag agaggtacag taagaatagc tggcgtccag tgaacatgta cagtggacca
36241 tgcacagttc caagcacgtt cgatttatta tttcatctaa gactcacgag aactctataa

```

```

36301 gacaaagggtc tgacattctc atccccgtgt tagatgtgag gaatctggag cacaaatgtg
36361 taagtaatth ttctgttgag aaatggacct atcaggggtt gaaccaagc agtttgctc
36421 cagttaatgt ctttcgccac tttatatga actgagaaaa ggccgggaca aagtcacaac
36481 caaagggtggc tttggccttc agaataattcc acctactgcc atcaatattc caccttctca
36541 agcccacatg ctccctgtttc tttttttgtc ccccatcttc ataattaatc atccttgcaa
36601 taaaagagac ttttggaat ttttttgga aaatgaagtc tttgggaggc caagggtggg
36661 ggatcacttg aggtcaggag ttttaggcca ccctggccaa tatggcgaaa cccctttgt
36721 actaaaaatt caaaaattag cggggcgtgc tgggtgtgtgc ctgtagtccc agctacttgg
36781 gaggtctgagg caggagaatc gcttgaacct gggaggcgga gtttgagtg agccgaaatc
36841 atgccacagc actccagcct gggcggcaga gagagactcc atctcaaaaa aaaaaaaaaa
36901 aagaaagaaa gaaaatgaag ggtatagctg aaatctgctc atttcatgat cttgacaatt
36961 taaaaaacct gattgctgtt gcagtaggac tgtttaaaaa aggaaagaga aaaatatatt
37021 tttaaaaatc tgagcatgtt gaaagacaca aaggaccttt gttacaagtc actcctacca
37081 atggaagaac aaccgttgct ctcatctttt tttttttttt ttttttttgg tcatttctac
37141 tctccagtgg ctgagatcaa taagagatgc tctatgggtg cttttgagtt cttttggatg
37201 tcttaatgaa gggatgaaca tattgttttt tttttttgac acagggtctc attctgtcac
37261 tccctgctgg agtgagtgta cacaatctta gctcactgta gccttgacct cccgggctca
37321 ggtgatcctc ccaccttagc ctccctgagtg gctgggacca caggcacgca ccaccatgcc
37381 cagctttttt tttttttttt ttttttttgt attttttagta gagacggggg ctcaacatgt
37441 tgcccaggct ggtcttgaac ttctcagatc aagccatctg cttgcctcgg cctcccagag
37501 tgctgggatt ataggtattc gccgctgtgc ccagccacat attgcttttg atgtagttaa
37561 acagttaact gctaccaagc tcttcacaga ggttactggg ctcaggaata aaaaggcttc
37621 tactccaaat ctggtagcac cttgcaccac aaagacttgc tctctcagta agaaaacaaa
37681 tggcagttct atatatagtc aagagtggag gcaggaaaag actacatttc tgaaaaatgt
37741 gttcccaaga aatccatgtt aatcaatgtc agagaccatc cagtttttat atattgcagt
37801 ctcaagaaat attctgccac agattctcta aggactgatc ataaaaacaa aaaccttttt
37861 atcttttgta agtttgtcag ttctaacatt aaatgcttaa ttttgacagt taccaaaaca
37921 agtcgattct agctttcctt ttttaaagtt tcagggtgaa tttgctataa tctcatgtcc
37981 atcctcattc aggcattgctg aaagcactaa tattctgttt gcttttgagt gctaaagaaa
38041 tatagcccat gagattactg gccaaattga aaagaatgag gcttattgta ccaagatatc
38101 tttcttgata aattaagtca atgatctatt tcttgacta gaggtcttga ttgggtatgt
38161 catagcgtaa ttttggttgc cttctgaggc acacctattc tcttgctctt taacttggaa
38221 agctcctaac tcagaagcca ctctgtgaac atatggctcc aaagattgct tcagattcct
38281 ggctgcctgt gctaattgta gtactcacct ttggacagga tatctaattt ttagattcta
38341 gacagttgaa agtaactaac ctctctaggt tttctctctg tttcctagag taaatgttat
38401 caatgtgatt taatctgact agattactat acatttttga acgtaatcat ttatttgtgt
38461 ttatatattt tgctcttgtt tcagctacgg aatttttcta tttttttttt ttttgagaca
38521 gtgtgtcact gtgtcccca ggctggagtg cagtggcgca atctccgctc actgcaacct
38581 ccgcctctca ggttcaagca attctcctgc ctgagcctcc caagtagctg ggattacagg
38641 cgtgagccac tgcgccagc caaggaattt tgctttcttt agtcagctag attttaact
38701 ccacgaggtc aggaaactta cttttcacac gtttttcctt cttatagaat aatattttct
38761 cgatatgttt tagagggtgg attttatagg cagtgggttaa agactgaaaa ctttaaccac
38821 tttaaactct gaaattctag gcaatgggat ttgtactgaa agacatagga taattatgac
38881 acttcaatta tagtccgttc aattcaccac tgggggtgggt ctaagtttag ttcatgggtg
38941 ctttctccca ggaaatctaa agtactttac atatatagct ccattgtttc tcatagcatg
39001 caaccttaac ccagtgtttt cacatgtgat ttgagagctc gatacccaaa ttatgggtcca
39061 tgcaccagca gcaccggcat cacctaggag ctgggtgggaa atgcaggctc tcaggcctca
39121 cccaaggcct catgaatcag agtctgtatt ttaacaagat ttcgggtgat ctgtgtgcac
39181 attacagttt gaagagataa gacaccaaaag ttaactattt ttctgttat cacatggcaa
39241 gtagatctcc agtccctgag ctgggttgca tagcttgtga tgttgatgtt gcaaagatgc
39301 aggtgccttc ttttcccatg atgatgcaga gcccctcag ctccctgttg agcctgtgat
39361 ggtctctaca ctccgtgttt ttcttcttag gctctttatc tgtacctgcg ttgcttttgt
39421 cccttaaggt tttgtccctt tgatttcttc ttaagtgtc tgaacttaat catttttgt
39481 ttcttaattt taacatggcc atttcagct gatgacagtt ttataatcaa aaccacatg
39541 caatcgatta ataattgttt ataaagcaac agttgtctac aaaaaaagtg gatcttctg
39601 agatgaggct atatgtaaaa tatggatgga atttgtatgc caattgggaa ctgatggaga
39661 aatgtattht ggtctgacat aaaagtctct ttctcaaact actttcatc aactaagcaa
39721 tgaaagagca gagaattctc aacttgcttc actactggaa agtaaaggga aatttatggg
39781 ggtaatagtg acattgagaa gtagttcttt aaagaactgc atttttcata ggtaactgga
39841 aacatttcca gctttgaaaa tgaacagata tctttttctc tcatgtttag taaggcttta
39901 gaaatgagta ggaacaattt ggtagaattt cttacctgta tttcaaaaca tgctgagtct
39961 acttgtttaag taagatgttt taaaagcatt tgggtccttg aattctgcta ctcataagaa
40021 tgcatttcta gagccgggcg tgggtggctc cgctgtaat cccagcactt tgggaggccg
40081 aggcRggcgg atcacgagg caggagatca agaccattct cgctaacacg gtgaaaccac
40141 gtctctacta aaaatacaaa aaattagcca ggcatagtgg tgggcgcctg tagtcccagc
40201 tactcgtgaa tctgggaggc ggagctttca gtgagcagag atcatgccac tgcactccag
40261 cctgggcgac agagcgagac tgcactctca aaaaaaaaaa aaaaaacaa aaaaacgcac
40321 ttctataacc tgcaccgatt ttgtagaat tagtgtgatc tgaagctagt tgcctgaat
40381 atgctttatg taaatatgtg tggctcactc aagtaatttt cattctttag attacatctc
40441 tcgatctttt tggatgtaac tggatttgct ggagtttaaga aWgaacgttg tcattcccc
40501 tgccaccccc caccttctc ggctattgat gtaataaatg taattacgg actaagaaat

```



```

40561 cctttccagc tgaaggaaca aaccacaaag tctgtgcttt aaatctttgt aattttttct
40621 ttccgtttta aatctaagcc atatatctag atttgggcgt gctttttgca ggtgtctatt
40681 ttttagagctt tccctgtttt gtaatttccc agttctcagt catgagtatt ggggaaaaat
40741 gcacattaaa attgggtttt acttttggtt tattttaaaa tttgttttga gttttataac
40801 tttaaaagcc tegtgcattc ttttcacagc ttccagcccc aggaacatgg caatggaaca
40861 tgttttattgc cagtctagca tctagaaaaa gctaactcct ggatgacaca aagtaaatga
40921 ttgcaaaaag aaagagagag aggaagaaag gatgacaggc aggggaaaga tcagggggtc
40981 tgaccacaga ggtggcgcgt tttactgaat taagcatgat agttgttgcc caggaaggtc
41041 tcacagaggg ccacatgtgg ggtcagaggt tgcctgtcac atgtggttgg cagccagaaa
41101 cagccatagc aaggctgagg ggagcatcat tcattttttc attcagttag gtttttggtt
41161 ttgttttttg agacagggtc tccctctgtc actcaggctg gagtgcagag gtgcaatctt
41221 agctcactgc agcttccact tcccaggct caagggatcc tcccacctca gctcccga
41281 tagctgggac tataggcaca cgccaccaac acccaactga ttgttgtatt tttagtagag
41341 atgggggttc gccatgttgc ccaggctggt ctcaaactcc tgagctcaaa gcaatccgct
41401 ggctcagcc tctcaaagtg ctgggattac aggcgtgagc caccatgccc agcttcagtt
41461 aatgtttatt gaggctccctc cctgggttaa ggaatgatac ttcagcttta acagtgggg
41521 gtaggcgcca ggatcagggtc ctgggatgtg tggctgtatt tttctggcat gaggcgttt
41581 ctcaggcatt ggttctttcc aagcaggaaa gtttattaga attttgaca gatgcggttc
41641 atttcaccca ggattttgtc ttagtttttag cagcagagac agtgaatctc actgggtctt
41701 aatcaggaaa aggagttggc cgttaaataga cctcaggagt ggcttctggc ttagaccctg
41761 gagatgccgt gtggtttgct aaggatcaac tagctcatga caaatactag aagagactta
41821 ataaatctgg acctttcttt accaatccaa gttgcttgag ttgtaaatga tgtaaaaata
41881 gcaccctaca gacactagtt gttcagggtg aaatctctta tttccattag cctgattct
41941 agagaagagt ggagagttgg ccttaggtgc cctctttgtc tttgactgta tatgtggcac
42001 actttcttca gccaatggaa tggcatacgt tgtatgccat ctgcaagagc ctgataagtt
42061 gcattacaaa tagagtgtgc aaacaatagt actgattaag tgacaaatgt tgaggcctgg
42121 gaactgattt ttggcactga caaatlaagg cagattagac cgcctttcag gacacttttg
42181 ataagtctac gtgtatgtga aagaagaagg tatcagaaaa aacttaatag agtttcttag
42241 caagagtact ggaacataat tgtggatgcc taagaggaag tgtttgagtc aggaaaattt
42301 cagttgtcct gaattgatga acgagtctct ttttagtaaa tgcttctttt aacggtcag
42361 gttagttagg acttagagac aaattacaga gtagcttatt gttatttctg ttgttgata
42421 ataaactttt ggagatgaac ttcattaaat gcccttggtc tggttttgtt ggtgaaaagc
42481 tgaaataaat ctattgttgt taacatctgt ggtgatatag acttgaaatt ataacttag
42541 catgggttag aggagctgtg agaaacagtg aaaattcata tagcacttat tatacacagt
42601 gtatgaaatt aataatctct gcacctcct cccaattgct gaaattattc ttacggtttc
42661 catttcattg tggtagcata gtagtatgta gggatgctgg ggctaagact attagcatta
42721 tgggaatatt taaatataat ttaatatgag aaaaatcaga ggaatgtgca aactctaggg
42781 tgtatttctc cctaattgggt aaatccagtc atatatctct gacagaattg taaaaacact
42841 gagttatttg atctttcctg actgacttat cttggagtca tttatattta taacatgctg
42901 tgcaccaaag catgaaaagc agaagcatac agtttcgctc tcatctgaag taataaaata
42961 ttttttattht acatagtcaa tctgggatag attatagtag aaaaccctta caaatctgag
43021 atactgaaag tggtagccgt tttcagagat aaataagtaa cctattagcc tgattagatg
43081 tctttgctac tcacatggta aataaggcgt aactttgctt gtttactcct ttaaatttcc
43141 ttatagatgt acttactttc tttttatatg ttttaaggct tagtagaatt tcatcccttc
43201 ctccagcttt ttattgtata aaatgttaaa tgtggaaaaa ttgaagaatt tatgtagcat
43261 agcacatctg tatatctact acctaaatta attaatlaac atgggtgctgt atttcgtttc
43321 tctctctctg tctttttttt tttttttttt tttgagacag tcatctcgct ctgtcaccca
43381 ggctggaatg cagtggcgcc atctccgttc actgcaacc cgcctctcg ggttcaagtg
43441 attctcctgc cttagcctcc cgagtagctg ggattacagg cggccgcccac tacatccagc
43501 taactttttt gtatatthtag tagagacggg gttttgcat gttggccagg ctggtctcga
43561 actcctgatc tcagggtgat tgcctgcctt ggctcccaa agtggtggga ttataggtgt
43621 gagcaaccgt gcccagcctg catttgcttt ctctatttgt gtgtgtatat gtgtatgtga
43681 aggtatgcgg atgtgtgtat atatatatat atgttttttg ctgaacagtt tgagattaat
43741 cagggttaagg agatgtcatg atgcttacc tctctctcta tatattttt aaggcagggt
43801 ctactatgt caccaggct ggaggcaggt ggtgcaatca tagctcactg cagcctcgaa
43861 cttctgggct caactaatcc tcccacctca gctcccaaag tagctggaac tataggcaca
43921 tgccaccaca cctggctaatt tttaatthta tttctataga gagaaatctt accatgttgc
43981 ccaggctgggt ctgagactca agtgatcctc ctgcctcagc ctcccaagta ttcagattat
44041 aggcattgag cactgtgcct ggcctaagtt cttgagcatc tgtttcctaa tagtaagggt
44101 attctcgtac ataaagacac taacatttca aaatatgaaa aatgaacgat aattttctca
44161 ttatatctgg tatccagttc atattthaat ttatctagtt gtctccaaat tgtcttttat
44221 ggcgattttt tcttcctaaa ttcagataca cagtgtcat gcattgcaat tcatattgta
44281 gtccctaaact cttttatgtt taatctagca tctagaacag ttctctcact tttttttttt
44341 tttttttttt tttgagatgg cgttttgctc ttgtcaccca ggctggaggg caatgggtgt
44401 atattggctc actgtaacct ccgctcctg ggttcaagtg attctcctgt ctgagccttc
44461 cgagtaggtg ggattacttg tgcccaccaa cacgcccagc taatttttgt atttttagta
44521 gagacagggt tttaccacat tgggttaggt ggtctcgaac tcctgacctc aggtgatcca
44581 atggccttgg cttcacaaaag tgctgggatt acaagtgtaa gccactgtgc ctgggatttt
44641 tttttttttt ttttgacatt gacttttagaa agagaccagg ccacttgctt tggaggacat
44701 cccacatgga ggatgtgtct gattgtttcc tgttgaggct gttcagtttc tctattcat
44761 gatthcctgt aaactggaag ttaggccaga agtttgaggt ttattagttc agttaatctt

```



```

44821 ttttgggaag atgaggtaga ggagattaag aaaaagtcag tgtcatcttc gcagagtgat
44881 ttttcttaaa accctggcct ctgtgatatt gagaaagtca caatattgga aggtgacact
44941 tgtcaacttc tgattagagt ctcttcctta ttttaaaaga catgaactaa aagttgactg
45001 ggtttcctgt cctccccctc tcaccctatc tctttctatc tcctcttctt tgctcttcca
45061 tggccatgag tatgtgccac taataggaca ttttcttaca atgtggcaat ttccttgtat
45121 acgtttatgt ctagcccacc attctatgag ctgctgacag cagggagggtg ttgctttttt
45181 tgtgatttct tgaaacccaa tataattcag tgttatcaca ggccaattta ttaacattta
45241 aaactctctt cttggccagg cgtggtggct cacacctgta atctcagccc tttaggaggc
45301 taaggcagga ggatcacttg agcccaggag tttgaggctg cagtgaacca tgattgcagc
45361 actacactgc agcctggata acagagcaag accctatctc aaaaataaaa taaaataata
45421 aataaataaa agtctcatct taaatttgat ggggaaagga attttctgga tccacaactg
45481 aattgtctat gcttggcagg cagatgtttt ctcaaagggt gaatggattc accttctttc
45541 tcttccctag tttagctact ttcactccct tctagtcttc atatattccc aagtgaagtg
45601 agaagatagg tctgtatata agtgactgtc cttttctttt Wtcttttcga tttctctttt
45661 aggagctgag atgtttcttc tctgaacttt atttttcatt gcttatggct ttttttttct
45721 cccctgtaag ttctctgoga gctatacacc tgtggaaata tagggactct ccttcatttt
45781 caaagagctc agaatatcgg tgagacaaag tcccttcctg cctggacatt cagattggcc
45841 ctatggactt aaattgtcaa gcaagtatac ttttttgtgt gccccgcaac ttggcctaaa
45901 ctttgctata aatggcaaag ttactgaatt gccttggctc cataccaaat gttggaaata
45961 attttaggat ataaaaacac atctttcata tgaaagtatt tcttttaggg tcccttgata
46021 agcatatata tgtgttactc attttcctaa tgaattagYt cttttcttca attgtaagga
46081 taaaccctca ttaatatcta atttgttgga atgaaaatga ttccagtaac atttttatga
46141 cttcaatgtg actcccttat gaaaaggcat aatggaatgg ctactttaat caaatttgaa
46201 gaaaaaagaa atattattct gaatacgcac ttcataaata ggaaaggcag ttttcagcat
46261 ttactttagg tatcattttat tcagtgaag cttgagggtg acccccagggt tcctgcaggc
46321 aattaagacg aaagtcatga ttttgagag ctctggggtt agtaaaacca cattagatta
46381 gagtcttag accaggaagg ggccctagaa aaccatcaga tcaagcctct tgcctttagg
46441 caaataggat actaaccctt gttgacagac aagcatattt gaaaccaata atgggtgttt
46501 gaacaaaaga aaaatagggg cttggagcct gggttttcat cttttattgc actcttccta
46561 ctgtaattat agttttattt ttcaattcaa ttcattggat ccgagaggag ctcatattatc
46621 gatttgcaac ctaagtatta gccatggagt cattcttgaa ctttgccgtg gacttgggtg
46681 aaaaatgttt ctgggttttca aggcctccct agtatcatat ggtattggaa tcaaaaatag
46741 agtattgttt taaaactgtc agcataggca gaacttctca tccagcaacg cattccgtag
46801 ctcaagtcct cattttgaac ataggattgc aatgctgagc ccctaccatc tttccactgg
46861 aaggaacagt tgggcagctt tttaaggtag ggcgctcgt ggaggactcc attaagagg
46921 aatcatggct tcctgacttt ggattgatca tttttgttca aaacaggagt attcctgagt
46981 cagagtcagc cacagcttat aggcaacaat tttcaggaga caacatccca agttaactgc
47041 ttatggcccc caaaactgta aggcctgtga tagtgcccca gtgaaatatg ccactgtggc
47101 attcccattc ttttagctcc tggatttctc cttttcagcc cataataggc aagggaagt
47161 aagggaacta acaattatat gagcacttcc tctgtccac acatgggtgt aagtccttta
47221 aagaaaacaa ggttttcttc actggttctc tatggccatt attagagaat gctggagtca
47281 ctgatctgga aaaacctgtt taattccttg gtctcaattt cttatctgta aaatgagatt
47341 aaattggtaa aatatgtgaa gcacttaaaa agtatgtttt aaatgggtact tagtgttacc
47401 cacttcatat acatttctgc cagctctatc atacctaatc actcatttga tcatgtcatc
47461 ctcttcccag tctctgttct ttgagctgaa gaatgtttgg tgattcctgg ctgcttctgg
47521 gcaaaactcc ttagtttggt gtgtgatctg gcccgtctt acctctttag actgatagat
47581 cccttcattc tcgcattggg attaaaaatc aatatagacc atgattttgg gtttatggct
47641 tctgtaagtt tgtgagggtt ctctacctaa aattccctta ccacctgtcc tcctatgtcc
47701 cttccctcta cagtctccac ctgttcaa atcccatgtcc cttcaggaca cgggtcccag
47761 cctctgcccc aatgtagcct ttcctgcttg cctttaaact gggagtaata tcctcctttg
47821 gattactagc cctgtattta tagctgtttt gaaaccctat ggaagtgtag gctttgaatc
47881 atcaaaaagt attaatgtat gttcagtact tccatttact cagtactaaa gttcatcagt
47941 gtattttcaa acatttttca acaagacttg aaataaaaaa aaagtttttc cttagagggt
48001 tttttctttc tttctttcct tttttttttt tttttttgtc catttgacat ctgaatcctg
48061 aattgactag acaaatttgg tttttctagt cagtgggtta ctgggacatg ccattcttca
48121 aacatttcta ggaatcccaa tacctagtag ctgattcggg cgtgctggag aatacaaagg
48181 cagtaatcaa agagcctaca cagagagaca ctgaatttta gaaccaggat aaatcaaagt
48241 gacttttagt aaacgtcacc acgatctgac gtgatctgaa taaaccacaa tctcagagag
48301 tgaggatatg ttttgagtaa atttgttctg tgtgttggcg agagtggctg cctagttaac
48361 cgtgggcagg tctgtgagtt tgcggcatgc cccttcgttc cagctgcttg ctgataggct
48421 ggcccaggcg ggatccatcc ttctgatcgc caggctcctga tgaggctggg gccaccacta
48481 catccattcc agggagactc ccaRtctctg tcagtttctt ctgcttttct gaattctaaa
48541 ctcactctga tctgatttca ttatttgtct gttgtggtag ctttgggtgaa gttggaccac
48601 aaataatgat atagaagaaa aaatgaactt tttttcttct ttcctgtgtc cttttatcag
48661 gtatcatttc ctctataaaa ctaattttaa gttgatagag tcttaggtct atagccactg
48721 ttgaatgcac ctaatcaggc catctccttg aactagagaa tgtttgcac ataggataga
48781 taccaggttc cctgagagggt gggtaccagg tgcctgggaa gtgaagtaac ttgccaagaa
48841 cagagagcca gggagtga ca ttgcaggcat ttaagcctag gcagtctgag tcccgaaaac
48901 aagtcaagac atttattgKc tttccatttc ttacctatgt tcttactgtt ttgcctggac
48961 tcctctttta atctcagtga aaaaaaaaaa aaaagtacat atttaacaac tgaagaaat
49021 aaacagagac tgtagtaaat ttccaagcta atagcaagtt atgtaaaaaa tactacttgc

```

```

49081  tgatgagggt  tgtaagaacc  tcctagaacc  ttatagaaca  agtgtggaat  acttgttttc
49141  tgctaagggc  tattgacccc  aagaaaattc  aatgaagcga  tctttgcaaa  atagtaaatg
49201  atttttcttt  gtctccctgc  agaagcaaag  aggcttagac  ctctagccac  tggtgaatgc
49261  accaaatcag  gccacctcct  tgagctacac  agaatgtttg  cattatagga  taggtgccaa
49321  gtgccctgga  aggttggtgg  agagagagat  gacttccagc  tgagattgta  cagtagaatt
49381  taatatatta  agttttctcg  tttgacgggg  ctgaattagt  tcatatgagt  tcataagtag
49441  gaactgcttc  gcttaatttt  ggtgaataaa  atatcctggc  tgcaaaatac  aaaaaagaaa
49501  gtcaccctca  ttttcaaatt  tatgggttagt  gctttccata  gaaaacatat  ggctaaatgt
49561  gtgtgttttt  ttaatttagc  tctgaaatgt  gaagactgta  ataagatcta  gtaacaagag
49621  cgcagtttag  aaaaacctga  ttgactctag  tttatgtaac  tatacaggct  atataaagaa
49681  agtctcataa  atRaacttca  tctaaagagt  gtggcagcta  taaccttctc  caactttcag
49741  gctctgggtg  ttctcctagc  ttcttctgag  tttatagtct  ttatgtaatt  attaatacca
49801  tgatgatcat  tctgggggtt  gctttttgcc  ctggtcactt  taggtttaat  tttattccat
49861  tcctgggtcat  ttaYagtttt  gttctgtcat  ctccccatac  ccatcgagaa  ccctattctc
49921  ctgtggcaga  ctttaatgaa  tgtaaccgca  gattatgtgt  tttctttctt  tgggtgaactt
49981  agaggatgca  taggccaggt  gccagtgtt  agaagaaacY  atacctttcc  tgatgggtgct
50041  gcatggctag  cctaccccg  ccatgcagta  agtgacttcc  tcaccgctga  tgtggcagac
50101  ctgctctgca  tctccacagg  gtttctgggt  tcttttccag  gctgtttcca  tattgcacac
50161  tcagactggg  taggaaagca  ggcagggcac  agttttatat  gtacgtcagc  attttcactt
50221  ggtgatggat  ataagctaac  ttttgtagct  ctccctaggt  tattactgac  atctgttccc
50281  ccctgagcat  atccagctgg  ggctgaagcc  acatctgcac  tttaaacttc  catctacctt
50341  tatgttttca  atgtaatttt  agatttcatt  tgtttttaat  tgtgaactca  gaagagatga
50401  gttccagcta  tgactcagtg  tgagttccta  tgtcataatt  ctacatttct  ggagtgttta
50461  cacctgacag  gaataaactc  aaggaaacaa  aaagaacagg  aaaggcctta  ggcacatact
50521  ggttgtttca  gatgtggagt  tctgctggca  actgccacag  agtgaaattg  gccacatgga
50581  atccaaagca  cggcctcaca  ttgttttttt  tttttNgaat  attttatgta  agacagggat
50641  gttaaaggta  gaggaagtaa  ttaagaatgg  cagctatgtc  tttaaaatta  aacacatcgg
50701  tcataacttt  aatgaaggYg  taaaagtgtt  tttagtttta  aacaggcaaa  aaggctttta
50761  aatacaagta  accagttttg  agactttaaa  aagcagaagt  ttttcatgcc  agtgcttctt
50821  attttagttt  caaaggaaa  gaggaggagc  tgaggtttgg  atggttatca  tagatgaggg
50881  agttgacatg  atcaaaaatg  tttttttccc  tgggaacaca  tcttgagtgc  ttatctcttc
50941  taatagataa  agggctgggt  aattttgaat  gtttcctgca  gctctgaaga  aacactgtga
51001  tcctaataaa  caccgaggaa  agcttgtatt  gcagccctaa  atattacctg  cttcaaggag
51061  gcagcatgtt  ttggtacagt  ctgatcatga  ctataaatca  aagcatcttt  acttctccag
51121  ggagataaaa  aaaatcatgt  gttactttat  aaggatcttg  tagttgcagt  atgtctgtca
51181  gatgtttcca  tttttatgat  ttaagacact  tgggtgctgt  atgaatagca  aattggaaaa
51241  attgggcatt  ttttaaat  tgaattttat  cttagcatat  atctggaaat  gaaatagcga
51301  tcttggaaca  gagacatctt  tgttagaata  tgaaagaatg  tcagtgaatt  ctaacttgaa
51361  gctacattga  gatgacatgt  taaaggcatg  aatagacaaa  gggaatgatt  ttcaggaagt
51421  gccttctgga  gactgtggga  aatcccgtca  tgggtagagg  aacagcttgc  gattggatca
51481  aagtcacgca  aagttacgca  ggtggtagat  gctggtagtc  aacatggcta  ggtccatggc
51541  aatcgatcat  ttgcccagca  ttttgccctg  tgaatttggg  ggagtgaaga  ggacattttc
51601  accaccccag  gaagatagta  actagtgtct  tatgtatgta  gctcagagcc  cttgaatttt
51661  caagtgcact  tttaaaagt  tccccagaaa  aggtttgaat  agacttccta  tctattactc
51721  taagttaggt  tctaagaaaa  ttcccaaatt  gggttaataca  gtcgatcctc  aatctttgag
51781  aattctgtat  ctgtgaaatt  ggcctacttg  ctaaaatgta  tttgtaagcc  ccaaattccat
51841  ccgtgaggac  tctttgtggt  cattgggtgga  tatgtacaga  gcagcaaaaa  aatttgagta
51901  gctcaaggta  cacgtacccg  gtggagggtg  aacaagggtg  cactctgcct  tcttgccctc
51961  gttctcatac  tgtaaacgag  tgtcctggat  gcagacaatt  cagtgccatg  tcttctgcat
52021  ttttgggctt  tttcttgggt  atttccactgt  ttaaaatggc  tccccaaata  tagggctaaa
52081  gaactgtcca  gtaggacttt  tttttttttt  agatggagtc  ttactcttgt  cgtccaggct
52141  ggagtgcagt  ggcttgatct  tggctcactg  caacttccgc  ctcccgggtt  caagcaattc
52201  tcctgcctca  gcctctcaag  tagctggggg  tacaggcatc  agccaccacg  cccggctaatt
52261  ttttatattt  ttagtagaga  cagggtttca  ccatgtcgaa  caggctggac  ttgaactcct
52321  gacctcaggt  gatccaccag  ccttggcctc  ccaaagtgtc  gggattacag  gcgtgaacca
52381  ccgcgcctgg  ccctgtccag  tgtttttaag  tgcaagaagg  ctgtgatgtg  ccttataggg
52441  aaaaatacat  gtgttagcta  agctttcttc  aggcattggc  tttagtgtg  ttggctgtga
52501  gtttagtgct  aatgaaccaa  caacttagat  caaataagcc  attttttttt  taaaaaacag
52561  aaacacacat  aaaatgacgt  tataagttag  ttgatgaaaa  ttttgtgacc  agaggcttgc
52621  aggaacctaa  ccctgtgttt  cccccagaag  ctaaggatta  gtatttccta  tggcgggtgt
52681  caaggcaact  tcatagacag  aactaccatc  atgaataaca  aggatcactg  tgtgggctga
52741  gtgcgggtgg  tcatgcctgt  aatcccagca  ctttggggag  ccgaggcagg  cagatcacct
52801  gaggttaagga  gttcaagact  agcctggcca  acatgatgaa  accctgtctc  tactaaaaat
52861  acaaaaatta  gccggtcaag  gtggcgggca  cccaataaaa  tgacaataga  gtttaaaactc
52921  catggttttt  gaggcatttt  ctgagtaaat  tggcatacag  cgtatgtact  ctttctctta
52981  gaagtccag  aaacaacact  atttctttat  gtgcaaaatg  gcctcttttg  agcagccctg
53041  gggcagtttt  gtctggccct  cttgcagcca  ggggtgcccc  gtttagtgta  caattgggtat
53101  aaaaataggc  aacacaggaa  cttgcttgtc  tcgggggaaa  agacgcttgc  agatttatag
53161  aaattttaca  tttgtatgca  tgatattctg  taggttcaag  aaaaaacaat  tcaatttcaa
53221  gataacattc  tacagggtaa  ataaaattta  atttcaataa  atttaagggg  aaaagttgtc
53281  catcttttca  tactttctgt  aacttttgta  gtttcaccac  taacaacaac  aaaaaaaaaa

```


53341	gaacacaaac	aaaatagcct	tgctctgggt	tttgaggaaa	tggttttgca	aggctatttg
53401	gtagacaat	gaattagagt	cagaacttcc	gggatgggct	ttcggtaagg	gaaatgctta
53461	ggctgctgca	aagcctggat	tcaacttaca	caggatcctt	gagaagttgt	tcttcgcatc
53521	cagaaccatg	ggcaatgctc	tatggtataa	aaaccccgaa	ggtaaacact	gtctgatata
53581	tattttttat	aattgcaaaa	tacacataaa	cttaccatct	tgactgtttt	taagtgtgca
53641	gttacatatt	cacattgtcg	cacagtctcc	agagctcttt	tcactcttgca	aaactgaaac
53701	tctgtaccat	taaatgactc	ttcatctccc	tctctccagc	tcagcccctg	gaaaccacca
53761	ttctgttttc	catctctatg	aatttgacta	ccctaggtac	cttatataaa	tagaagcata
53821	gagtatttgt	cttttttagta	ttggctgatt	ttacttagca	ttatataatg	tccttaaggt
53881	ccatccatac	tgtagcaggt	gtcagaattt	ccttccttct	taaggctgat	taatatatta
53941	ttgcatgtat	acaccacatt	ttgtttatcc	attcttctgt	caatgaacat	ttgggttgct
54001	tccacaattt	gactattgtg	aataatgctg	ccatgaacgt	gggtttgcaa	atatctcttt
54061	gagaccctgt	tttcaatttt	tttttgttgt	tgtatactca	gaagtagaat	tgctggatca
54121	gacggtaact	ttatttttaa	tttttttgag	gatctgccat	aatgttttcc	atgggtggtc
54181	caccatttta	cattcccacc	cacagtacac	aggggttcca	gtttctccac	atccttgcca
54241	acatttggtta	ctttcatttt	ttttggtagc	tgactgataa	ttatgactaa	ataatattgt
54301	tgaagaacta	ttacaatgtc	aagaaatttt	ggccatcagt	gatagtctta	tgattaaact
54361	tagtagtatt	ttattattaa	acttagtagc	atttattagt	agtagtttta	tttcagaaat
54421	at ttgcattt	tccatgtttc	tagccccctca	attatgtagg	tagaaacaaa	taatataгаа
54481	tcaattttacc	ttatgtttacc	ttagaactgt	ggccacagcc	tagtaggtgc	tcagttcatt
54541	tttggttaa	gaatgaatca	atgaccatga	agacagttca	ggttatttgt	tatggagata
54601	cgtaatggga	ttggaaaaca	tgtagggtaa	atgtattagc	cctctcctgt	gttaactctt
54661	tagccctttc	aaaactaaag	gtatttgccc	atgtgcgggtg	gctcacgcca	ccgatcttaa
54721	ttttttttatt	ttaaaaatag	cttacttaaa	aaatagcttt	gttgtattaa	aaaatagcac
54781	ccagctaat	tttgtatttt	cagtagagac	aggggttcac	catgttgggc	aggctggctc
54841	tgaactcctg	gcctcaggtg	atccacccgc	ctcaggcctc	ccatagtgtc	gggattacag
54901	gcgtgagcca	ccacaccggg	ccaggctttt	taacatagta	acataaacat	ttttattctc
54961	acaatgtctt	tatgggtttg	gaatgggtggc	ttcctgtctt	tcagagtctg	gtgttatttg
55021	ttttttttggt	gtgtgccttg	cagacacctg	cacttgaaat	ctttcaggta	ttttgcagtc
55081	gtttttctcag	atggctggat	tatttcaagc	caagaataac	agagttaggg	tcaagactgt
55141	gaaccgtatg	gtcagtcctt	ctaaggaagt	atttattttt	attcactttt	gtttgccttt
55201	ccttgggtca	tggtccta	tgctgttccc	tttggctgca	gttattcaaa	actgaattta
55261	ctgctgagcc	taagacagtg	tttttcaaac	ttttaaaatt	aagacaccca	gtaagaaata
55321	tgtttttacag	ttttttttaca	tcctgaccag	atttacacac	acacacacac	acacacacac
55381	acacacacac	agaacctgaa	gtatttggtg	caagttgcag	atgttttacag	ttactgctaa
55441	ggatatgtgt	ttccatttaa	tttacataaa	atactgttca	ttgaattgat	tttatgactc
55501	acattatttc	Rtcatgcagt	ttacaaaata	ctgagcactg	gtgtcacaga	actttgtcgt
55561	tcattgtctt	tagcaacagt	cagcttttct	gctcatgact	gatggcctat	tgctatgatt
55621	ctgttagcgc	tttaaagcaa	tttgattgtc	aaagtcattg	tagctctggg	tgtgtattca
55681	gttactcagt	ttcaccttta	caggcagctg	ctccttggga	aatggggcct	gctgagcagg
55741	ttgaatgttc	catagaatca	gatctatact	ttgggggaact	cagcagtatg	ggaatcacia
55801	gccaaccac	cctatccgtt	aaagggtcca	ggccatttgg	tctccattgt	cacttagact
55861	agcacaacat	cacctacctc	atggatgctt	tgagggcagg	gccgggtttg	ttttctcttt
55921	tattcctcag	agcccgagc	atgattcctt	gtgtggagaa	tatgcatcag	ccttggctct
55981	ggctcctctc	tcactgtccc	tcttctcctc	cctacagaaa	acagcaaagc	atgtatagaa
56041	agagatgtgc	agactgtgtg	gaatgacctg	aggggttaact	tgcttagagg	gtagagactg
56101	ttgtgtgtaa	aaacttatgt	ttgaggcaaa	ttgcaggaaa	aagttcttta	aatgaaggaa
56161	agataagatt	ataagttttt	taaaaagttg	tcttaatgaa	tagaggagaa	tgactagtca
56221	ttatttcata	gatcataggt	acataggtga	ttttaaaggt	tgagtgactg	gtcccttgag
56281	gttagttcaa	tgctcctctg	taatctgaat	tttttcatca	aattctttta	aatccagggtg
56341	gggctcagct	ccctctgaag	tatcacaaaa	ccctaaatga	attaggttta	taagactaat
56401	tatatttcca	tagcaatgtt	taagtggcct	gctgccccat	caccttccaa	gccctgctct
56461	gttgggtttc	ttttttacca	gtcatgatca	cgtaggacca	ggctgttttt	cgtagggggg
56521	tatggagtgc	caatgcctgg	ggtgttagga	atataggctg	ggcttgtatc	atagtacca
56581	cgcgctgcc	taactcttga	tatccagtga	ctgagttaga	ctttgtagct	gctttctctt
56641	tattaggaga	aaagagcttg	tttaataaac	ctaagaatta	atagcctgtg	ttcagtagtt
56701	ggatttgtaa	cctgaatgtt	tttatgtcta	ctgacttgca	acgttgtcat	ataaattaaa
56761	gatcatagat	ccagctatgg	tttaaagggtg	acttccagga	catggatttg	aaagatcaga
56821	at ttgaatct	catctctttc	cattctagct	tggtaacctt	gaggaaacca	cttaacttct
56881	ctaagcctca	aagggtgtcaa	gtagattaat	gcaactatgt	atagctgacc	ctgaggaatt
56941	tttggttccg	ctagaataaa	gcttgaattt	ttggacatta	gaaggatctt	tgaagatgat
57001	gtagcttcgt	tgtgtaactg	aagaccagag	aaattttaagt	gagtttcctg	gaatagttta
57061	tgccctctgct	tcctgtgtca	tgattaccac	ccagaacacg	tgcttaattg	gggacaggta
57121	atccattcag	ggtgaagaac	atggcttttg	ggtcagtctg	cagtggatct	aaatcagccc
57181	cctgctgttt	actgtgtctg	tagtctagaa	aaagctatct	aacttcttgc	agatttagcc
57241	taactatgaa	attaaattgg	ggatttaaaa	aaactcatag	ggacgtgggtg	aggcttgact
57301	gagataaatt	tatgcaaagc	tcttagcaca	atggctagta	cccagaaagt	gctcaacatt
57361	attattattt	cctaattgaa	gggcattgat	gatttaaaat	aaaatggagg	ctgggtacag
57421	gctcatgtct	gtaatcccta	cactttggga	ggccgagttg	ggtggaacac	ttgagcccag
57481	gacttttgaga	ctagattggg	caacatggta	aaactccatc	tctataaaaa	atacaciaat
57541	tagctgactg	cgggtgggtgc	tgtagcccca	gctactgaag	aggctgaggt	gggaggatgg


```

57601 attgagcccc ggaggtcagt gctgcagtga accatgattg tgccactgtg ctccagcctg
57661 ggcaacagag caagaccggt tcaacaaata catacatgca tacatacatg catgcataca
57721 tacatacata catacatata tgtaataaat taaataactc atttcttggtc agataaatgg
57781 ctgtatcttt ataataagat atctgtatcc tgtgacttca tcttgtaaata aattttgtgc
57841 ctcttggtgc ttctatgatc tagggaggag aaagctaatt ctcttctcatt ttatgcacgg
57901 agcagagaca cggagagcct ctaattttatt tcttcttggt gtggccctgt tttctgagca
57961 tgggtgtgtc tgatccctgg ggagagcaga gccacactgt ggatctgagg tgctgggaag
58021 ccatccagtt tctcctcctc gaccctgact caagtcttcc ctgaaatctc tgtcagcccc
58081 attctctttc tgtcagcccc attctctttc tgtcagccgc cctccttaca taaccctaat
58141 ggggtgtttg caaagctagt gtcgctgagg tgttctgtgt acaacagaaa agaacttagg
58201 gaggattcct atgtgtcact aaagccagta attaagtgga caacaggggg agctaact
58261 gaatgcacca ataaatttca agactcctgc taccctaggt aaccgagtca atagtattag
58321 aaaccatttt aagcattggg agtttttaaac atgctgttta aaaacaattt taaatttacc
58381 ttcacttttc taattggata ctttactatt cagagtacta tgagatgagg gtctcgcttt
58441 ggagtgcagg ggactgatct tggcttactg cagcctcaat ctctggggt caagcgatcc
58501 tcccacctca gcctcctgag tagctgagac tataggctcg tgccaccata gctggctaata
58561 ttttaatttt tttgtagaga tggggtctca ctatgttgcc caggctgggtc ttgaactcct
58621 ggctcaagc aatcctcctg ccttggcctt ctaaaatgtt ggcattatag gcgtgagcca
58681 ccatgcccg ccaaacttct tttgaaatta gcttgttgat tcttctcac ctcccagttg
58741 tttttgtgcc agaattaatt tttctccttg tattatagaa tagtttgagg gagtattgaa
58801 agaattaggg ggtagagttg ccagatgtag caaataaaaa tacaagacac ccagttaaata
58861 gtgaatttca tataaataac tacttttttt ttgctatata tatgtcccat gcaatatttg
58921 agacatactt atactaaaag attgttaatt atctgaaatt cagatctaac tgggcatcct
58981 gtattttatc tggcaaccct aactgggggt gggatgggtg ggagggcctt ggatgtggcc
59041 agaggagagg tgtcagagcc tcaggtgtct tcttgtgggt gaccgagggt gctgcagcac
59101 agtagccttg ctccctgggt ctggggcctg tgccctctcc ctgtagtcac ttagaatagg
59161 atgatggggg tggctcaagg cagtggata aattaattct gaaggaacac actgggcccag
59221 agtcctagaa cagtttactt aatgatagt ttattttaat tttcaattgt ttgcctttct
59281 tccctgtgat acggaataaa catgaaattg tatctggagc ggagcaggca gaacttacat
59341 cttgttggtc ttgttctgcc ctgagcctct gatgtctac aaggtttctc cttttgtttc
59401 tttttttatt atccaaggaa tgagatatgc cagaaaaatg tgacagggat ttatgaaatg
59461 ctttgaacta ggtgagctta gagcataagt aatttttaggt catttatctc atcacaacac
59521 tatctacaga gttttaaccc ttatcataag gaacagacca tgatgacact gacattatca
59581 acataacgac acacatgctt ttctattcct aatgcttttg tgagagaaac tggggcatcg
59641 gagaatgttc tcagccatat ttttgatatg gcctaaggta taatgaacaa aagcttagat
59701 gagaaaagtc catctgattg atgcctggct aattgacagc caattatgtc atggtgccag
59761 ttcttaaaga aattgacca ttaatccctt tgtgtggaga ggccagccag caggcatctg
59821 ctttcttagc atgcagcagt actgaaaagt ttattgaaat aatcgtcacc tgtcctttcc
59881 aaatcttaat tcttctgagt ttaaacaatg tttctctaag gaaagtcgga ttgacatgaa
59941 atcacacatg tctggaatta tctctgagtc ctttataaac agaccaagac ttggaagggc
60001 acaccttagg ttacagagtg ttttctggg ctgggctcca aagcttcctg actattgaac
60061 aataatgtgt tctttccatg ctactttata tatttatttt acagaagcct tgtgcctttt
60121 atccggtcat atccactttg aaaacttact tgtggcctgc cagagcagag gtacaaaaaa
60181 ttccggatta ttttctgttt agaggcccca cacaatacag tatatgtgct gaagatgagg
60241 gcaactcctc tctcctcctc cctcctcctc cttcctatcc tacccttcc tccacctcat
60301 ttttcttctt ctttttttaa aataatcata agcatgtgtt ttcttctcat gtgcttgtaa
60361 atatttttgt tggggattct tgactgggat ttcagaatat cctgataggg agaagttggg
60421 tatttcttca tgagataaat tccttaagga gagatttgaa tagttttgac ctttgggttt
60481 tcttttctct ttcagttttc tttctaaaaa atgttacatt tcttggttat gagataaaaa
60541 caaacctata atttgtgata atgggtgaaa atgtgattag aattcacatt ctaggtttaa
60601 taatgacaga ctacttatga aagataagat gtcagagctg gaaggcttct tagatattgt
60661 cgggttcaat attcttttct cattagagga aatggagact cagagacatg aagtgacttc
60721 tccaagggtc cacagtaagt gagtgatgaa gctgggagta ggacctctt tgcctgactc
60781 caaacacagc tttccccaac tattgaggaa aaggactcag gacaatttaa catttcaagt
60841 cattgaaata tccttttaaat gctcaaaact taattttaac cttatgtgtg tgtgtgtgtg
60901 tgtgtgtgtg tgtgtataag tcgttctaaa gtacttaacc ttctgaaatc ttattttgac
60961 catgtagaac acagttcgac cttttttcaa tctcatcatt atcaacactg ttttgtgaac
61021 atgggtcatt gtgggttttaa ttcattgggt cccttgggct attctgagtc tataggactt
61081 gcccttagtt acattaacac tcccacatga caaaactcat gagtgcatgg ggaacttttt
61141 gatatccttc ctcatgtgca gttgtcactt tttgctactt tcagagggtg tatttatagc
61201 atttccccc ttctgtgttg ttcctacca caggatttta acttacagag atgactgaat
61261 gatgacacag aggggacaag tccattgaaa taagtcttgt tttgttttgt tttgttttgt
61321 tttttgggac aggggtctcac tctgtcgccc atgctggagt acagtggcac aatctcagct
61381 cactgtagcc tttgtctccc aggttcaagc tattctcccg cctcagcctc ctgagtagtt
61441 ggacttacag gcgtgggcca ctacgctcgg ccaatttttg tttttttagt agagatgggg
61501 tttcaccatg ttggccaggc tgggtctcgaa ctctgacct caagtgatcc tctgcctcg
61561 gctgggtgtc taggattaca ggtgtgagcc acagcacctg gcagaaagaa attttttttt
61621 attactcaca tttcctaaga gaagagggca ttccatgcca cacagggcca ggaggagaag
61681 cacctatttg ggtgaagagg aagagatggg agtcagggga aagccgaggc cagagccttt
61741 actgggtttt tatggaaaag gcaaggcaga ctggaggaa attttagggc ggggaaatgt
61801 gctgggatgg tcttttagttg tcagttcctg gccctgagag attttagggc ggggaaatgt

```

61861	gggctgggta	actgagagtt	agataaggag	gtggctcagc	tagatcacag	aggagatgga
61921	aactacttgg	ctgttaactt	gccctgtaat	tgatggatac	caaatagcca	aatacagatt
61981	cggagaaaat	gcaggacaac	ttcccaggct	tactttgctg	ccattcattt	tgtgggtgaac
62041	caaaaaacca	cttacacaaa	cctgttggaa	ggggtctctt	ttgtgagtag	tgtcaaagag
62101	agctatctag	aagagacctt	tttttgtgag	tggtgagggt	taggctgaat	ttttattttg
62161	ttttgggtgct	tttctgtaat	ttgggattat	taaaaacaaa	gactagacct	ttttatagat
62221	agaaacaagg	ctctttttatt	tggaaataacc	atgtgcataa	atgatgaata	aatagagtca
62281	gtgaggacct	tcttgccctc	atgattcatt	gttcttctcc	ttctcctttt	tctccttctc
62341	cttctccttc	tctttctccc	cttcctcctc	ttccttcttc	ttcttttttt	ttttttaata
62401	tgagacacag	tctcgctctg	ttaaacactt	gtattagttt	cattgaaagt	gtaatataaa
62461	atctgaggat	ctcagacatc	ttaggaagat	gactgtcatt	tattatctat	taaccagggtg
62521	agcaacttcc	tggcgagtga	ggggtgcggc	aggggaagggt	ggagacgcaa	aggcacagtt
62581	ccctttgtaa	tggagagctt	cagctcctgg	gaaggatctg	caatgcttag	tggggctggt
62641	catctctaata	atagttaata	attactgatt	tgtatgaagc	agaactgagg	gcaggggagg
62701	atgtgggaag	gccacaggag	atatgagttt	gcagccagag	tttaccggtg	atgaatcacc
62761	ttctgatcaa	agcaggaggc	tgggacctgt	gggggatgca	cttcgacctc	ggggtgtgac
62821	ccaggaagtc	agtgatattgt	gaagggcatc	ataggtcaca	gatgcctttc	caaagttacc
62881	agaacttggg	atccaattta	tttctcttag	tccaggctca	ggtttgattc	ccaatccctt
62941	gcattcacac	gagtcacagg	gcagaaaagt	gcagacgtgt	tcttgtgcga	cctccagatg
63001	tggtgtggag	atggaagatg	gtactctcat	cattagagct	gatttgcttt	ggaattaaag
63061	agagacatac	gcactgtggt	tctgtggccc	atcatagttt	ccactgatgg	tgccatgtgt
63121	catttggggt	aacattgact	tgtattttcca	ctcagtgtga	ggaaaggacc	ataagacaga
63181	attggagtaa	tttctggaaa	aaagaagtaa	atgcttagta	gagtgtcata	cagtctttta
63241	ataacaagta	tttgataaac	atgattttgt	tatccatcct	tctgcaggaa	aagaagccaa
63301	gttaatttttc	ctgagttttac	agattggagg	gttttttagta	taacctgtgc	ctttttcctt
63361	cacctgtttt	cctctttttac	tactacagta	aagagggtga	aatttagttg	caaaaggata
63421	ccattgaaat	ttagttactt	ttgctcgtct	cttgctaaaa	gagttaataa	tgtgcagtct
63481	ttaacttggg	ctgatttttg	tataatgtag	tgggttttcta	aaaatagatt	tctttttcat
63541	gtaattgaca	attaactcca	taagttactt	tacagaaatt	taagtttctc	tagaaattac
63601	tgcagtacac	attgcatgca	ttctccttaa	agaaaattga	cagaacaaaa	tttcatcctc
63661	tgtaggagc	ttgcttttcc	ctcacttgct	catctcatga	ggggaagcat	gtattataatc
63721	atgtaattga	cctcccgagc	tgtatggcac	ccttgagtga	accaggtaga	agcagcctcc
63781	acccaggcat	tttctttaatg	tccacaaaagg	ctcgtctgact	tcaagttagc	tatttgtgtc
63841	ctttaacttg	ttgccacaat	ttaaaaccag	gtgagcattt	tctgcacaga	gtgggtcataa
63901	gcagtgtctg	ttctgctgtg	ctcggcctct	ttgtcacctg	ttccatattt	gggcatgaag
63961	cactaggccc	atatgccttc	accatttttg	aatgttggtc	tgggacagag	ttatagggtt
64021	tttgccctga	acaaagcatc	tacattcttc	attcttaggg	agtgcagatt	ccattgccaa
64081	tatgtggata	tcagttttct	tcaagcttgt	gtaccactcg	tatccactgc	tggtcagttg
64141	cataatctct	aagattaaaa	actacatttt	ggtaatgctg	gcaacgaggg	cacaaggaaa
64201	taaattgtct	gtttttataa	acatgtagct	actgatattt	ttttttgaag	gtgaaagctt
64261	tattttaagg	aaggtctcat	agagagtttt	aaaatttttag	aatgaaaaaa	ggtcttaaat
64321	ttattaacca	aatagtaaac	taattcattc	aaccaaaga	cttactgaac	actccctgag
64381	tgaagggtgtg	tgtgttagga	aatgtgctta	ctgggtgaac	acaacagagg	tggtcccccac
64441	ctcatgatac	ccacagtcta	gggagtgaac	ggcaataatt	aagtaatttt	taaaaattta
64501	tagctgtaaa	gtaaagcaaa	ctatggcacg	tccatgaaag	agagggtaga	gcctatgagc
64561	ggggaggcgg	ggaccagatg	gagcctgggc	tcaggggctg	ccagacacac	acagctgcct
64621	acgggcagga	agggggccca	ttggaagcgt	taaacaagtg	tctgtataga	aggaaggcat
64681	gtgaataaag	aaaaaaagat	tgacctttgt	gagttgtgac	atccaagggtg	tccaggaact
64741	agtttctcca	ctttcttttt	ctcctttttg	tcattggcgg	cagttggggc	cttgtactgt
64801	tcatcagctt	caccatcaaa	atcaaataaa	aagaaagaga	agggaaatgga	atgctcactt
64861	tctagacctt	acttttaaat	ctgttgaaga	tttattaata	tttgggagag	agtttgaaat
64921	gataatccaa	aagatgtctc	cctttgaaca	tatgtagaag	ttaatcattt	agattaaactt
64981	gcatttaaac	acataattgt	atgtgatcgt	atacatattt	tggctcactg	ttttgtgttc
65041	aaaggcagat	ttcctagggt	agtgtgatt	tattctactt	cttttaggct	gtgtaattca
65101	ccttttttct	aatttgggga	aaattgtggg	cactatagtt	atataatttt	tatttaaaaa
65161	cttgaataat	tttattaagt	tatctacca	aatcttcttc	ctgaaagata	atatcttttt
65221	ttcctttttt	tttttttaaat	ttcagtaggt	ttttggggaa	taggtgtcct	catagcttag
65281	ctcccactta	ggagtgaaga	tataggatgt	ttgggttttc	attcctgagt	tacttcactt
65341	agaacaatgg	tctccagttc	catctagggt	gctgtgaatg	ccattatttc	attcctttat
65401	atagctgagt	agtattccat	tatctatctc	tgtatatgta	tatatcacia	cttctttatc
65461	cacttggtga	ctgataggca	tttgtgctgg	ttccatattt	ttgcagttgt	gaattgtgca
65521	gctataaaca	tgYgataaca	cagtatcttt	tcagatatgt	gtccgtctga	catgttctgc
65581	accaccact	acactgcagg	gcatttaggt	aagcagcatt	tataagagtg	actggaaatg
65641	gcttaggaaa	aatggtagag	aatgtaattt	atcagaataa	tcactgatcc	tcttagcatg
65701	tgtattcaac	aggtaactgt	gactctaaaa	tggtattttg	gagggaaatt	gcaaccaaaag
65761	ttagaacacag	ctctagagggt	gctgggatct	aggggcctta	gattttttca	tctcagttaa
65821	tcacaccatg	ctttagggaag	ctttaggata	agattctggg	gctagtgtcc	ccgggtgggtt
65881	ttgcttctga	gaaccaattt	tgcagttgtc	acatgatgag	ttggatcctc	atgcagatcc
65941	tccaagggtc	ttactgaaca	ccatcggttt	atgctagtga	gggtttgtgg	ttctcagctt
66001	cccgcatagg	aatgaacatt	atgtgggcct	gagctgtgac	agcttccttc	ttcagcttcc
66061	ttccttgggt	tcttctgggt	ggggatagga	ccacttcttc	tggagaacag	cagggtgggtg


```

66121  ttcaagcacc atcgtactct cctagtcctag agctcagcca cccagtacta tagccaatag
66181  agatatattg ctcaaaaaca catgagagat ggtagtgtga cagaataatg gaattgtaaa
66241  ttgtatttag ttttaataca aacttttaaa ttgatatacca atatatatga ttggaacaac
66301  ttgaatatgt gagcttacct tttcatctct aaagtttatg ataaaagatt tccagtataa
66361  atttaatgtc caagttgaga tatgctgtga gtgtaaaata catgctatat ttcaaagact
66421  tagtatatta aaagaataat atacaataag taatttttaa atgttgatta tttgttgaga
66481  tgataaatatt tttgggtacat taggtttaaataaaaatgtact attaaaataa tgttatcttc
66541  ttaaaattgt gatgactata aaatttgaaa ttgcataggt ggcttacata atgtttctgt
66601  tattgggcat tgccctagag ctaactgagg aaaagatcat agggcaccat ttgccattgt
66661  tgtcagtatg tggctttcag tactaggagg taaagtagat actctttcca tactaaatac
66721  taaatgccac tatcattaaa aaacaacatg gcaaactctg cccttaaggg gacctcattt
66781  tttccccagc aaaacaaaac cgacagcctg ttatatagct aaagagtaga tgaaaatact
66841  taaacaatat aaatgaactt tattgggttaa taggtgcagc aaaccaccat ggcacacatt
66901  tacctatgtg acaaacctgc acatcctgca catgtatccc agaacttaaa attaaatata
66961  tatataaaat aaactttatt agttatgcaa tgaaataaaa cagagcaagc aataccttta
67021  ggttcactga attttaaagt taacaccttc aatacaaatg tatatatatt gtatacacgg
67081  ttatgaaggc atgaacatat taatgagcaa aataattatg aatacttggt cctcttttgt
67141  agtttttaaa atgtataagc aagaagtaac ttgacatgac ataatgctgt gccacctgac
67201  ctattctgtc gtgggctcca aatgtaaaatt catcagaaga gctcacagct ttgttgaatc
67261  tcctgcctct ttggggagat aggtcctatat gtctcaattt tgaagcacc cctcttggat
67321  gaggtcagtt agaccactcc aaggaccact ctcttttctt ctttgtatatt tctggggaaa
67381  acgtatagct agcatgctgg gactgtttgt tttgaatgag tttgtttatg agttttcaaa
67441  acaaaattat gaaaaaaagg gaagtttcca actccttggt catgtcttgc tggctaagca
67501  gatgatctct aaaaacagat tacaatatca ttttgaagg aacaaaggta tcttccttgc
67561  ttatctttta ggctgcatat tttattgttt atacattggc caattaggaa ctgaaattta
67621  agaaagacag tcatttttaac ctattgaagt cacagaatga aatgatgaag taatcgtatg
67681  tgttcccagc ttagcatata tgtatatata tgcattgatg aataatatga tttgttgtaa
67741  acaaatgaaa aactgcagaa acctgtaatt tgtacattat tatttcagat caccgtaaca
67801  aatattacca ggtttttaat tttcttttaa aaaatgcatt tctagggctg ggcgtggtgg
67861  ctacgcctg taatcccagc actttgggag gccaaaggcag gaggatcacg aggtcaggag
67921  atcgagacca tcctggccaa catggtgaaa ccctgtctct actaaaaaga caaaaattag
67981  ccgagcgtgg tggcacgtgc ctgtagtccc agctgctcgg gaggtgagg caggagaatt
68041  gcttgaacca gggagtcaga ggttgcaatg agccaagatt gcggctgcac tcctgcctgg
68101  tgacagagcg agaccccgtc tgaaaaaaa aaaagaaaaa aagattttct aaaattgtat
68161  ttatactctc tgctccttcc ccacagcca tcaacgcttc cctccctccc tctccctccc
68221  ttaatgataa gccctcagct ttgctcagga ctacgcctcc catgtggttt tggtaagtgg
68281  tctaagacct gaggcccaaa gcgtgattgg ctgatgctgt gatttctcag cctggttgcg
68341  cattagaatc accctgggag ctttagaatc cagatgcctg ggctctactc acagagattc
68401  tgatttaatt ggtgtgttgc agaacctgac ttgagccatt tcgaaatggg tcattgatag
68461  cttgtagctg taacgattca aacatataca acataagcag ggtgaccaca gaagtatttc
68521  tctaagtctg gtatgttctc aaatgtcttc taaattctta tcttccactc cagggtttt
68581  gaagtggcct gatccaaaca ccttctttcc gacattaaaa acattagccg gttattttgc
68641  ctcatcagca cttcctacac ttccttaggt gagccagggt gcttttaatc tcttgagct
68701  gccttcgtta ataggccttt tttttttctt ttttgtttta aattgtatgt attgaaagta
68761  tacaacatga tatttgatat acatattcct agtgaagtaa ttactacaat taaattaaca
68821  caccatcat ttacatagat tacctttctt ttttgtggc gagagtacct aaaatctact
68881  atcatagcaa atttgtaata tataatgcaa tattattaac gacaataact gtgtggtact
68941  ctagattttt tcatccaaga taactgcac tttgtatgct ttgatctata tctcccat
69001  ttccctgccc ctcccgatta tgcttttga ggcagtatag tgtgacagtt agccatcact
69061  gaattctggg ggctttttgt ctattccagg gagatgaaat tgttagagaa agattaggag
69121  aaagaatatg aaaaggactt agagaggata caaaatcatg aagtcacaaa tacctgccaa
69181  acaaatccac ataaggagaa aataaagaaa tgtcagattc ataaaagatc aaaaaacca
69241  aactgttctt agagggaaaa gcatgcacag ttaaggaaac ttttttttaa aagttttaat
69301  aaaatctgat ctctagtggc aaataactgt tccaattac acctagactt ttatcgtgaa
69361  tcaggttttc tagttgacat tgtgttttt catttgaaaa tgaatgctgt gtattctcct
69421  tgtttcaatt cccttatgta ttttgtgtt aactccctct gccggggagc gccagactca
69481  gatgaaaggc attatgacat tcgagatgaa taatgacgta agaaggactt actctattgt
69541  atatcacggc gcagtatcaa aacattttgt cccatgagga gaggcagtga gtcagaaaat
69601  cctgttgtaa ttgtattata atgtagaaaa ccatttcaga attactgtct gacatttggg
69661  cagctgggac tttgagctca ttccacggcc accccacctt agacatttta ttaggaagat
69721  gctattcttt tttagggcta tctactggtc tttgtcctca ctgatgaatt aattaggtag
69781  gtaataatga atctgagtta ttactgctga caatttagtc ttattcttaa aaacgttcat
69841  ttcatgggtg gttactctgt tctgtgttgc aataaaggaa tacctgagac tgggtaattt
69901  ataaagaaaa gaggttttat tggctcatgg ttctgcagcc tctgcaagca tggcaccagc
69961  atctgctccg ctacctgtga ggcctaggaa ccttgtaatc aaggcagaag gctaaggggg
70021  agcaggcaag acacacggcg aaagaggagg caagagagag caaggaggga ggggccttgc
70081  tcttttaacc aaccagctct tgtgtgaact cagaatagga actcacttgc tatggcaagg
70141  acaggaccaa gccattcatg agtgatccgt ccctgtgacc caaacgcctc ccactaggcc
70201  tcacctccaa cattggaggc cacatttcaa catgagattt ggagggggaa aaaacctcca
70261  aacctcatca catggttaag tggcataaga tgcaactcta ggaatttttg ctttttttaa
70321  acccagcttc gagctccctt ccattccttc atcaagatat tcatgatgga tctgcattgg

```



```

70381 gacctgcttt tgtcttattg tttcccaaga ctaaaaaggg ttttcagcgc aagtgttctc
70441 gtaatgtttt tgtccccaag attggatggt tttcagttgt attatctccc catatttctg
70501 acatgtacag acgtgccag ctatgataKt ctgtgtggat ggtcttaaaa atgagttatc
70561 attatgaata gtttgatgga aagatttccc aggaagcatt atgctttgag tgttggggaa
70621 gagaagccac cagatgtcgt gtaggccctt gtccctttac tgcctttcct ctctgtttgt
70681 acccctgtac aaggcagctc ttgtgggttac gatttggttaa caatttgagt agctccctta
70741 tattttgctt ctagagtaat taaacattgt ttcttagaaa tgtaaacadg ggacttagaa
70801 ttacgatgca gtaatgcatt tggcagctga actgtgtact gggaaaagaa aaatatcctg
70861 gagcgggttt aagtttcgca gataagaaaa atggcctttat ttagtgaatt ggaacaatac
70921 aagacctgtg ccctgaagtc agtactttct cttcccagat gagtttcccc aggcacaaga
70981 ccaacttcta aaataaaaact tgaaagtaaa tggcaaaaac cagaaacaga gccctgtaaa
71041 ctagactttt atgctacggc gccataaaaa taacttattt gctatcaaaa taagcttaaa
71101 cagaaccttt gtctgacaga tgacttttcc tctcccctta acctgacagc acccccaacc
71161 cagtcttttg tcataagcct gacagcacgg tgagatacaa gtccctagtg gcagtggagg
71221 ctgatgttta ttatttagag agtttctgaa aatgaaagtg taatgtcttg agtcacttac
71281 ttccaaattc ttcccagaga actttaaaata gtgttgatatt aaaaaacagg agtaaacaat
71341 cattcgtaaa acacacccca gaataaatct cttatttctg catgaaggca actgatctga
71401 aacatttttt ctatgtgcct ttttagagacg gcaccaaatt tcatgcgcgt tctgtgtgaag
71461 agaccaccaa acaggctttg tgtgagcaac atggctgttt atttcacctg ggtgctggtg
71521 ggctgagtcg gaaaagagag tcagcaaagg gtgggtggatt atcattagtt cttatagggt
71581 ttgggatagg cggatgaagt aagagcaatg ttttgccggc aggagtggat ctcacaaagt
71641 acattctcaa gggtgaggag aattacaaag aaccttctta aggggtgggg agattacaaa
71701 gtacattgat cagttagggt ggggcaggaa caaatcacia tgggtggaatg tcatcagtta
71761 aggctatttt tacttctttt gtggatcttc agttacttca ggccatctgg atgtatacgt
71821 gcaagtcaca ggggatgcga tggcttggct tgggctcaga ggcctgacaa taacacagtg
71881 ctcaaaaactg tcagatagcc tgtgtcaggt ctgaagatgt gattttggtt gtttataactt
71941 ggatgctttg gatgggaata gccctggagt cagcccttca tttcaggcag aggagcagag
72001 gagtgtgagt tagacacaac tttggatcag gggccaggaa aacttggttg tcatcctgga
72061 ccagttacta actcgtctgt tgggcaagtc acttcatttg tctaagcttc tctttttcct
72121 tttgtaaaat aaggatgtcg gcaaactctg gtggctccct ccaacagtgt tttttaagtt
72181 ggtgcctgag tatctgaagc aggagatacg aagggtcatg tgagctgcac attcctatth
72241 gctccgcagg gaggtctggc aagacacccg gccctgcct tgtaacctatg aacaaggttc
72301 tcgcaggggc tctctcaac tgcagggtccc ctgaagggtc catccttttc tttgctagag
72361 ggaatttgga tctcgttggt ccttgcctaa cccttgtctt tgaaagatac agatccaatc
72421 tctgtgtagc agttaagtga tctgactcag acatatttac tcagtcttct tagagaatga
72481 gaaaactctt ctcagaattt ttaagaatgt tctgaagga caataaaaagc tctcattcag
72541 gataggcccc aaaacatttt tttctttata atgtgggtgcc atttctctcat tttgcttttg
72601 ttcatttggt tattccttca acaaataattt ttgagaattt gctgagcact aggtattact
72661 agatactagg acagtgagat aagtaagata cagcccttat cttcaataag ctgtatgccc
72721 tgataatgat acccttagtg tcttctacaa gctatacggc catgcatcac ttaacgacag
72781 ggacacattc tgagaaatgc atccttaggc cattgcattg ttgtgtgaac atcatcgagt
72841 gacttacaga aacctagatg gcgtggccta ctgcacacat agggatatatg gtgtaacctc
72901 ttgctcctag tctacaaacc cgcattggcat gttaccatac tgcatactgt aggcaatttt
72961 cctctcccc taacctgaca gcacccatta cctgacaaaa atggtaagta tttgtgtatc
73021 taagcatatc tagacataga aaaggtagag taaaactaag gcataaaaag tgaaaatggg
73081 acacctttac agggcagatc catttacgca accaccactg catgcgtggg ccattgttaa
73141 tggaaactgt tgtgtggggc ataactgtat ataaaagtat agctacttta attttaagtt
73201 aaccttggtg tgtgggaaaa tttgtcttct gtgctgtctt gcactgaatt ttgcattggg
73261 atttttccct taatagtggc tgcaaaaaaa cttataaaata cagaaccttc ttcatttata
73321 gaattcttct gcattgacct ggaaaatgac gttgagaatt ggacgttaca ctacaatgta
73381 gtcctccaat gaaggctctc aatgggcatt tctttaaggc ctaagttaaa gataaaaatag
73441 aacaacttcc atcactacaa aagatagtgat actcggaggg acttgtagag attttttttt
73501 tcttgtagct gtttttctca ctactcaggt ttcctttttg agttttgccc ctggaggctc
73561 agagttgaat tctgttggtg gtacttaga accttcttac tgctctgtct ttcctcagtt
73621 gtgttttccc catgtgggtt tgttttggga aagcagtggg ggggaattcc tcttaggttg
73681 aaataacttt tagagcgatg gtgccacagt ttacaaatat ttttagaaaa atcctgtcag
73741 attcttggga acttcagact aacttcacat ctaaagttct cttttctttt cttttctttt
73801 ttccttccct ccttcccttc ttccttccct ccttcccttc ttccttccct ttttttgggt
73861 tttgagacag agtcttgctc tgtcaccag gctggagtgc agtggcacga tctcagctca
73921 ctgcaacctc tgcctcccag gttcaagtga ttctcatgct tcagcctccc tgagtagctg
73981 ggactacagg taccctccac tacgcctggc taatttttgt attttttagt gagatggggg
74041 ttcgccacat tggccaggct ggtctcggac tcttggcctc aagtgatccg cctgcttggc
74101 ctcccaaagt gctgggacta caggcgtgac ccaccacgcc tggcctaaag ttcttattta
74161 aaaatttttc ttctgatttg ttagtttaag aaggtaggtt tgaagcagtg accaggaatt
74221 ttcgggaaat ccattaagga ataaattatt cagtaaaaaca gtctcaaagt gagggccaga
74281 gtgcaggaca gaggcagaga gagatggtag cagtttataa agagaagata cttgattaga
74341 gaaatcattg tcagagtaac cttatgctta gaaagaaatc acacgcgaag ctctgtgttt
74401 gaaatcagaa gggaagggtg gcattcggat gaagaggctg tcggacttgc attactttga
74461 ccactactgt tgtttttgct gttgtgggtg ttgttgttgt ttggaagatg gagtaaattg
74521 caagcctggg ggatttcatg tgtttagaat tgtagctaaa atagctcctt acgttgaagc
74581 atttccctcaa ttctataccc acgttctcag tccttgtgtt actaccagta actcattttc

```

```

74641   caaaatgcag aattgcattt tacatttttag ttcttttcaat atttgatca aatacatgtt
74701   cagtggaaag ggtatgttta atttcctttt gggtcggcac taatttaa ataataga
74761   gataacgtaa ttctagtatt cgtatttgat tgttaaaata tttggactca gaagtgcatt
74821   tacacgtttc caaatgtgac aagtaggaaa aggtatagag tccaaactcc tcccaggcc
74881   tatccacagc taccagtggt cctatcccca ggcaaccagt gttaccagtt tcttgcata
74941   ccttctgcat actaccaata caaaagcatg ttattctgta gccccagcta cttgtgaggc
75001   tgagggtgta ggatcactcg agccgaggag ctggaggtag cagtcagctg agattgtgcc
75061   actgaactcc agcctaggtg acagtaagaa cctgtctcaa aaaaaaaaaa aagcatataa
75121   ttttgttctt cttgttttta tgctgatgag gacatgctat gtccactgtt ccatggtagt
75181   tgccctttata ttcagttatt cactaaaaaa atgagaagta tagagtaaaa tgaaagtctg
75241   tagtattctc cactagaaac aggtgtgggg ttcaaggagg agtgtgtatt aattattgca
75301   aaacttctgg ttaggtcatt aatcagaacg ggagccatgc agtgggtgaag ggccctggct
75361   atgatctgaa acatttttct gaagcagtggt tgagttctgt aactgaagtc catggggact
75421   tgctattggc ataactatat gtggaaaatt ttgctttttg agtaggacat tcccatgctt
75481   cacattta attgaaatttg gtatgactgt actaagttaa catagctttt cgcattttac
75541   agagacattg agtaaatcat tgactaaaga taattaactc ctttataatca Yatgctgaaa
75601   tggttatggg gacatatcat taccttttctt ggcttatgga agagatgtaa tctaattcat
75661   tgagtctgac tgtgtttaag ctattgtttt ggggtgtcatc gttggctctt agaacaggga
75721   ctggggcctta gtcccttttcc ttgctcatatc ctggcctcct cctagaagac cctgcttttc
75781   atgtttttatg cctcagaacc aagatgtttg ggggtcccaa gtagggatgt gtatgagcac
75841   atttttttgat actttcatct ttctcttact ctctaactatg cgttccgcta gtgtcatgta
75901   aatacagtga atcagatatt tctctgcctg caaaatgcct tttgccagta tgtgggaggt
75961   gtgttgagg gacacagtg gattttctgc atctgttcat acatccatct tcccactta
76021   gctgtgagtg gcctcagtg agaatgggtgc cttactctta gagtctggta ggaaatgcca
76081   tgcacatttg tcaaatgaat ggaaatgcag ctgacttgct agagctcagt tctgagtga
76141   ggggtgcttga atgctatata atcaagttga gatcttagtc tggggcagca gaaaacaaga
76201   aaagggtact gagcaggaga gtgacaggct ttcatttgta tcttaatggg ttaattgcag
76261   tggcattaga aaaggggaga gattggggta aggcattagt tggaaagctt tgataaagtc
76321   taggtgagtc aggaaggggt tctgcattgc ttgtttccca ttgctctaac tagatttctt
76381   agaaaaaaga aaatcttaca ccagactttt acagcgtttg caactgagta aatttcactt
76441   tgtaataccc tggatattat acaattatat aaagcgcagt ataataagag agttagtagc
76501   ttcattgtaa tcagtaaaaa taatttttaa gacaattgtt attttttgta tattgtatta
76561   taacaaaaaa gaagtcacatc agtgggagga ggtgtgtgtt tgagacgttt gctttcatct
76621   cttaatcctg cagacattta tctagtccct tctctgtact cttaa atgct agggatttaa
76681   aagacggata agatacaggc ttattatgtc tgtgttccag acactggact ccaaacataa
76741   agcaaacatt acattattct tccttatgta atagaaatgt ttatgtaaga ttgtgtgtaa
76801   atcagtcctg aataaaactga attaaatgga atgtgccaat aggagttgct atttagagaa
76861   gccctgtgat aaaacatttg tataataata tacttatcta aacaagccca ctaatttcta
76921   tgggtttttt ttttttttcc cccaaggcg aggtatcctg tatattctgt gttgattgaa
76981   ttccagttgg ccaaccacct gcctgggttaa tagagtatac cattaactta gtgacactag
77041   aaccctgcaa aggaataag acacaatcta tcgttgttca gtctccacta ttaaatagat
77101   tttcattcac ttcagcttgg gtgggtgtaa tttgcatctt tcctaacagg caagcatctg
77161   caagtgtatt gcctgtagaa gctcattaaa aatcagtgca aatcctgaca ctgtctctag
77221   aagcaggcat taacttgag aaagtgggtt gtatttccag tgtcaKtaga gcttcctcac
77281   tcttttctctg cttccatgca agtttagtcc taaactagta ccactatttt agtacaacta
77341   gtaccactca aataatgctg cttttttaa ataatcaagg ggaactgcta aggaactgag
77401   aacctgtaag gtgacaggaa aaaggaaatt ctattttttg gggctagttt gtgtattgaa
77461   aataattttt gctgagaatc aagctaagaa aattacttgc taatttaa acatgacag
77521   tcctcagaat tttccagcaa cagttaggag cactgtgata aagttggctt tctgtttgag
77581   aacgttttac ctttttgctt cagcttcttt aaagagtttg aaattagtaa tttcagtaga
77641   gcagctttgc tgttgctcgt tactgctcag agcttagtga gctgaagcct tttgggaaaa
77701   tagcatttgg ggagagactc gtgggtgtaa agctcatccc actggcacat gtcccagagt
77761   aagctgggct ggaagctttt agtgtagtta aaagatgcca gtctgtcatt tgcagcact
77821   gtaattgggc aagtgggttc aggctgagct ttacattatc cttccactga gagcagctgg
77881   tgggtgggctg tagattccat atgagctggg gacttatcat ctgggtgtgtt tagtgcaatc
77941   ctgcctcatc ttgggagcaa ttttttattg aatgataata ataatgcaca atcttgggtg
78001   aagataatgc ttgtgggtat tagaatgtgt agactgagta ggggctttgg catagagatg
78061   gtaatgggtg ggaaagacat atttaataaaa aggtattgtaa tggggagaaa gtaaatattt
78121   tgcaggataa ggaaagccac aaatatgatt aatttaagag tcttaaataa aatgtctata
78181   aaatgttaga ttttttagtac cagtaaggca aagtggccaa tctctagctt cctttataaa
78241   gtctactcat ccttgagggt tcgctttttt gtgctttttt tgtttgttca gactcaactt
78301   cttcctctag ggatatgttt aagtctgtca cctttcctta ggaattgtgc caatctgatc
78361   atttgttcca ccactgctgc ccgccccct tttcttgact caaagaataa tttgtgtacc
78421   ctgtctctgt tttttttttt tttctttttt tttttttttt attatacttt aagttctagg
78481   gtacatgtgt acaacgtaca ggtttgttac atatgtatac atgtgccatg ttgggtgtgt
78541   gcaccatta actcgtcatc tgcattaggt atgtctccta atgctatccc tccccctcc
78601   ccatctctgt tttttattat ttatttattt atcgtagag acagagtctc actctgtcac
78661   ccaggctgga gtacagtggg gcagttatag ctcactgcag cctcaaactc ctgggctcaa
78721   tcgacccctc cgcctcagcc tcctgagcag ctagaagtgc aggcacatgc caccacacc
78781   agacaatttt tctatttttt atagagatga ggtctctcta tgtttcccag gctgggtctg
78841   aactcctggc cttaa atgat cctcctgcct cagcctccca aagtgtctgg attatagggtg

```


78901	tgagccacta	cacccaggcc	ctgttttttaa	cttgcaatac	cttttctgca	agattgaatt
78961	tatatagat	tataaagttt	gtggacaaaa	tagaacactc	cattataaaa	gcctccttca
79021	tttggtttgt	tctctggtgt	ttgatttgac	tgatgtggat	ttgagtatgg	aagtgttcca
79081	tgccctatta	aggaaagcac	tttgggaatt	ggccagggcc	cacttaactt	agtttcagaa
79141	tggcagcact	ttggcagtc	tcagtttctc	ttatttccta	acccatccct	actcattaag
79201	acggggctat	tgcatcccat	tttcagggaa	tgctctttca	tttttcgttg	gtgagagaac
79261	atgaatgcct	cttaaaatgg	tggtttgagc	ttgctgagaa	ttttagggga	tccacagagt
79321	tgaaaagtct	tacaggctat	cagtgaagca	tggaggggtt	tcgttatgaa	aatgtcctga
79381	gatgggggga	agactggaca	gatgaggtag	gggagcctcc	ttgcaaagtt	agaattcagc
79441	tgttttatact	ggtaacagaa	tctgcttttag	taaggatgaa	gcaaaaagaa	aaacgatatt
79501	aacaccttga	gaaaatctct	gtattgtgag	cttaatccaa	caactccaac	gatgttagct
79561	actttttcaa	aatacatctt	agcccttggt	acaataacat	ttacttgttg	agtgaattt
79621	tgtattaggc	agattcactg	taatcagtaa	tcttccttcc	attgagattc	ttcctgttac
79681	tttcttattt	aaaaaccttc	agtagcctgc	atcctcaggg	ttctgtttac	agagaccctt
79741	aacagtctat	tcagccttac	ttctgccatt	atccctactc	taggctgagt	gttaaccata
79801	cctacctatg	tacatttgca	gctgtgccat	tttatctggt	tggattctta	acccctctc
79861	ttgcccaggt	gcctagtggc	gccctgttgg	cacgttgagg	ggtagcttaa	gtgtttactt
79921	ctttcccagc	tccctcagtc	cgtgttagca	gtaccctctt	ccatactctt	ctattatctt
79981	ctgcatactt	ctgtactcca	cctatctggt	gccatgaaac	aggtcacccc	aaaacagtgg
80041	cttagaacia	tactatggac	tgcgtttgtg	tccccccacc	ccaactcata	tgttgaaatc
80101	ctggccccc	gggcgatggg	attaggagat	ggggcctttg	ggaggtgatt	aggtcgtgag
80161	ggtggagccc	acatgaatgg	gatgtcttta	taaaagagac	cccagagagc	ttctttcctc
80221	ttctaccata	tgaggacact	gtgagaaaac	atctgtgaag	cagaaagtgg	ggctctcacc
80281	agacacataa	tctgcttgct	ccttgagccc	ggactccttg	agcctggact	cctcagcctc
80341	cagaactatg	agaaataaat	gtgtgggKtt	tttttttttt	tttttttttg	gtcttgtttg
80401	tttggttgag	acagggtctc	tctctgttgc	ctgggctgga	gcaaagtggc	atgatctcag
80461	gtaactgcaa	cctctgcctc	ctgggctcag	gtgattcccc	cacctcagcc	tcccaggtag
80521	ctgggaccac	gggcctgtgc	caccacgccc	agcttatttt	tgtatttttt	gtagagaggg
80581	gtctccccat	gttgcccagg	ttagtctcaa	actcctggaa	tcaagtgatc	tgcccacctc
80641	agcctcccaa	attgctggga	ttacaggcgt	gagccaccga	acccagccag	atgtttgttg
80701	tttaagccac	tcagactatg	gtatttttgt	atcttccatt	gtacttaatc	tatgggtctt
80761	atattcagca	gtattctatg	ttatgtaagg	agttgtggcg	tgaaaccact	tccttcatgt
80821	ttttatgttt	cttttttaatt	aaatttttaag	cctgggaatc	ttggtaatga	catattatat
80881	gcaaaatatg	taatattaga	ccttgattttc	atcagatcag	tttttagcact	tttcagtgtg
80941	caaaggtggg	tggtaatggc	tttttccaaa	gcatagtccc	ttggttgtat	tacactatta
81001	atgactatgg	gtagtgtcag	accccgagcc	caagccaagc	catcacatcc	cctgtgactt
81061	aaacgtatac	atccagatgg	cctgaagtaa	ctgaagatcc	acaagagaag	taaaaatagc
81121	cttaactgat	gacattccac	cattgtgatt	tgtttctgcc	ccaccctaac	tgatcaatgt
81181	acttttgta	ctccccacc	cttaagaagg	tactttgtaa	ttctccttac	ccttgagaat
81241	gtactttgtg	agatccactc	ctgcccgcga	aacattgctc	tttaacttcac	cgcctatccc
81301	aaaacctata	agaactaatg	ataatccacc	accctttgct	gactctcttt	tcggactcag
81361	cccacctgca	cccagggtgaa	ataaacagcc	atgttgctca	cacaaagcct	gtttgggtgg
81421	ctcctcacat	ggacgtgcat	gaaaggtagc	ataatacaat	ttttgctgaa	gttttggtgc
81481	tcttctactt	ttaaattaag	gaccagatag	gaaaggacat	atggtaatct	atcaaataa
81541	tagccattga	tattttcttt	gttttctttc	actaacgggt	ttatgcaaga	tttttttaaa
81601	aaaacagcaa	aatgaaaagg	ttcgtaatat	cctgacttcc	tgttttatta	taaatgagat
81661	gaacaccagg	tagtggtta	ttcctttaat	ttctttatga	gtcatcctca	aattaatgtt
81721	tgagggaatg	ttgggtgttt	tcaaatactc	ccgacatctt	ttagttagac	agcatagtga
81781	aatggaaaga	aattttgaat	ctgctagact	caagtttgca	ttttggctct	gtcatttact
81841	catagatgta	ctacttgagg	taatcatact	gattttgtag	accaattgga	aagataattg
81901	accagtgttt	tagggatata	gtatatacac	aaaatttgac	agacatgtaa	tcacacaatg
81961	cttaagcccc	atatgttatt	aagcccacac	tttggtaaat	aacatttggg	gcttaagcat
82021	ctgtgtgatt	ctatatatgc	cggatattgt	aaatgtaaaa	gtgataccag	ctaaatcacc
82081	catctttctg	ggaactaagt	acaaaggaat	ggttctgttt	ctaacccttt	ggcttagagt
82141	atcatagagt	tttaaatttg	gccagatttt	aatttgacag	ataaaaaaat	gaggcacaga
82201	taaaaaaatc	gagaagtga	atgaattatg	aaaactcact	agaggcagag	ttgaggacgt
82261	tgtccagtgc	tctgttgat	cattatgtca	ctgcctgccc	tactgttttc	ctgctcttcc
82321	cctcttcttc	ttcctccctc	tcagccctgg	tccacctacc	ttagtgcatt	cacacacgta
82381	tggcaaagat	caacaaggat	gctgggttca	gggtcctttt	cccactggag	tctggcaaca
82441	ctgttcctgc	cctgatattg	ttcttggttg	ttggYcactt	aaaacaatgg	catattttga
82501	agggctgaat	agacttcctt	ctttttaagc	ttttcttttt	atttatactt	tttggtccg
82561	tgtaatctct	ctgagtcctc	cacattattt	tctacttttt	ctcagttttc	atgacctgta
82621	ttaccattac	aggtgtctct	gctataattc	aatatacata	ttcctgaaaa	cctcatgttc
82681	tacaaaatca	tacattcaga	ataatctggc	taatgggaaa	tattggtttg	gggcagtcgt
82741	gcttatggga	aatattgggt	tggggcagtc	tggccttatg	gaaatattaa	gttgggacca
82801	accactctaa	atctatgcta	ctttgcaagc	acagcactaa	caaaaacaat	gaaaaccatc
82861	ataaaacagg	agcacagttc	agaagacata	ctacattcct	actatataca	gatacacttt
82921	ggtaaataatg	actttaactc	atgaaaatat	gcggggctgc	ttgatggaag	gggatgtaag
82981	gaaggatatg	aggctgggtg	gtactgggag	acaagaatga	aacacaccaa	gacgtttgca
83041	tgagatcatg	caaagagaat	catgcagaag	gtacatctaa	gacacaaggc	caaccgggca
83101	tgggtggctca	tgccgtgaat	cccagcactt	tgggaggctg	aggtgggcag	gtcacaaggt


```

83161 caggagttcg agacctgacc tttaacagtc tattcagcct ggcaactatg gtgaaatccc
83221 gtctccacta aaagtacaaa aaattagctg ggcgtggtgg cacgcaccag tagtcccagc
83281 tactcaggag gctgaggcag gagaatcact tgaacttggg aggcagaggt tgcagtgagc
83341 cgagatcaca ccactgcaat ccagcctggg cgacagagcg attctctgtc tcagggaaga
83401 aaaaaaaaaa aaaaacacaa ggcccggcag gctgagacca tgacaggaac ggtagagtg
83461 gacctggtg cagtgtgggg tgctctgttc agcctcacta tgaatttcac atccagcttc
83521 tgttacttgg agatataaaa cagtaatgtg tggagacaaa tcgtggatga accaactcct
83581 gagttatggc gtcatacaatc tgctatgacc agtcaaattc gcagtataga aacatgtctt
83641 gtagctggac agaaaacatc cagctctact gctgctaaac atcatggaat gtaccattg
83701 gtttatccat atagtaagtt ttaacattat ttttaataata ttgttcattc tgaatttgac
83761 agtggctctg caagtctccc tgaactccac aaattaaata aaggtatctc agagggcctt
83821 tcccaagaac tttaatgcca tcttcctagc aagctataga aaacatttga aaacccaag
83881 ggcaaagttc cagggctgcc taggggcaaa atcagtgaac agagtagtaa actgataaaa
83941 ccagcataga ggcctctgtg ggggaaaaaag acacctttct gcagttaata aacagtacca
84001 aagaacactg attgtcttct cagggtttgt agccatttct tgttttttat ttttaaactc
84061 cacctgttat ttttgttttt agctgttcca tagtagtctg atggaaatac actttatgtg
84121 ttcttgtgtg ccaatcaaaa ataaaataag cacaatgaat acctctaatt gcatagttca
84181 tgaaaggctt gaaaagatgc agagcagctg gctaattgctg ccaatgagcc attggctgga
84241 gcccttgta actcagcctt tgattctgtc ttcagcaagc cccagcatcc tcagggcca
84301 tgtgatgggt gctcagtggg actccagact ttgtggaggg ctctgtgggt ctgctgctgg
84361 ggaaactgtg tgtttctgag cctatgggaa tgggtcagaa agcctgggaa atgggggaga
84421 ataggagcag gaacacaaat gaggagccag caatgcaggt tgctattatg tcgcatgtca
84481 cttcctacga atatcttgat agattagctt ccttcaggcc caaaccttg aatggacatg
84541 aaccacagta tcagggctaa atgagtaaca gccaaacca ggtccactct ccagacagtt
84601 agaaaaggta gacatctctt gtagctggat ggagcagggg tctccccag gggtggtaat
84661 tcagcaggtc tttaaagaat gaataggatt aaagtaagtg aaaatggaaa gctgaaggca
84721 gggaaggaaa gtgaggctca gggagaattc tgggcaaggg aaagttacag agtgattcct
84781 tagagcttgt gagtctaaca attttgatgt caatggacct tattcttgga accacagggc
84841 aactgattga ctttagtttt cttttttgct atattcttgc cactcactca atgactgctc
84901 attgaaaatt gatgataatg gccatatgga aagtctcaga gcttatctag gatttgagtc
84961 cctgaggcat aatcagtggg tggaacagca gatggatggg gcagactatt tttctgttcc
85021 ttctgtgac agttgattat aagttataaa aatgggcatt ctctttgtga tcttagcttc
85081 caaaattacg gaaggttatc actattttatt attactactt tctcagcaaa ctcaaagaat
85141 cagagtgata ttgattatth agatttagca atgggggact taagctctta taaatcaggg
85201 tcatctgaat ctaaagatgt atgtctttct tatttcagtc tgaccagtta ttaagaatc
85261 caagatacct ttacttttta tttgaagttc cttaatttga taagagctct accaagcagt
85321 tggttctgtt tctctttcag ttctctgcca agcttttgtg tgtcttaaga cactgggact
85381 gggaaaagac tgcagtgttt gttaaatgta aattatactg agccttgagg atttgaatgc
85441 atggggagag gtacattttg gctttccttc ctttgtaaaa tgcagttaaa ctgatatcca
85501 gaacaatggt gagaaaacac caattaactg aatgtatgaa agacagtaaa ataaacaagg
85561 tgggcagtc tgtatgtgag gcattttttaa actctttgct gtgtaagtgc aggcttttgg
85621 aaagatctgc ttttcacttt gatttttgca gtcccacacc agcttgcttc tggttctgcc
85681 ttcagggaca tatgtgctct ctagatctgg gaatcttttt gtctggagac ctcaagattg
85741 ggatctgcac cctcccacc ccttcctgtc tgaactctat tttagatctg cagtaaagac
85801 ttgaggcttt ttgcaagctt tcaactctga ggtattttgg aaaactgtaa ttttgtttgt
85861 tctctgctgt atgcatgtgg tttcttaaaa cacgagtgtg attattttct gcaccccttc
85921 catagcaaac atttccctca aactacatgc tccaaaagta ggttctcact gcacttgcca
85981 tgccgtctca ttgcttattg agagtgactg tctctttaca acaaatcaac tggttacaat
86041 tttgaggctt tttaggtggc ttccaaactt gtcttggggg ttgtccctca tatgttcagc
86101 agccaaacat gctcaatgca ttgtatatth ataagaggc aggtctataa aatagcactt tgggtagtth
86161 ttatgaaact taatttgatg tgtggaagac cgtagtatg tagcatggac tctgaagcta
86221 ttaccataa gtttgagtct cagcttttct actttttttt tctagtaatt ttatttatth
86281 tatgttttac tgttaaattc ttaacctacc tggaaatttag tttggtatag ggagtcagt
86401 ttggatctag ctgttgattc tttttaataa taatttttag tgattttttt attgtgataa
86461 aatatacata agatttatca ttttaacctt ttttaatttag atgtacaatt cagtggcact
86521 aaacacaatc acaagttttc cacttttttag ctgtgttaga ggtcaaatta ttttacctth
86581 ctgctgtctc gtttcctctt ctgcaagtgg gaataatact cccattaagt tgttatgaga
86641 ttaagactta attcaggccg ggcgtgggtg ctcacacttg taattccagc actttgggag
86701 gccaaagcag gtggatcact tgaggtcagg agttcgagac cagcctggcc aacatgggtg
86761 aaccccatct ctactaaaaa taaaaaaagt taactccgta tagtggtgca tgctgtagt
86821 cccagctact caggaggctg aggcagcaga attgtttgaa cctgggagggt agagtttgca
86881 gtgagctaag attgtgccac tgcactccag cctgggtgac caagcaagac tctgtctaaa
86941 aaaaaaaaaa aaacctaaat tcataggaaa cacttgatga cttgatgtgt acaggacaaa
87001 ataagtgtct aataatagtt gatggccatg aggattttgt gtactggcag tccccattth
87061 gctagttaag aagcattttt tgagcctggg gccatatgtc tgcccatac atatgcctgt
87121 gtggtcacag taattgccgg ttgaatcaca gtggagacct cgagaattct cattggtaac
87181 actggataat tttttcatca tttttatgtc cacttttagc tgagactaat atacagtttg
87241 aacttcaggg gagaaaagaa gattttctaa cagattttata tttcaaattg tttacaagac
87301 aattgaaaat gaaaagataa aacctactta ctcttcaagt tcaaggcata atgcaagagg
87361 cttgaagagg gtagacttct gaatatattc cataaacagt atctcttttc agaggttttg

```

87421	agaaaaccct	tgtttaaaaa	aaatatgagc	aacaattatt	tgttattcat	gaattctaga
87481	tgtgtaaat	gtgtgatcaa	aatgagagga	aaaagagaag	tctcaagaga	ataagcattt
87541	tgtctacatt	taagtctttt	ggaaatgata	tgtttgaaaa	taatataccc	gttaaataata
87601	tttccttaaa	ttatttagat	aaactgtttc	tattgtagtt	tctggtaaac	agtaatatga
87661	aatggtttct	attttattgt	caacaacttc	attacttttt	aatgcagcaa	aaagcttcca
87721	aatagatctg	ttaaaaagac	tgcagaaatc	ctctgaattg	aataaactat	ttctagcctt
87781	aacattcatg	cttccacagt	ggaatatact	atattcagcc	accatcacaa	aaaatgtctt
87841	tcttatcagt	gctgccctag	ctaaatgtga	actttaaaaa	ttggaaaatc	aggcactttg
87901	tagacagttc	actccttgtt	tcatattttt	gggctaagga	aaaaaaattg	cccaaggaag
87961	tatttctgga	aggagtctaa	cttctcaata	aacatagtag	tttagcctac	aatatttttg
88021	ttgttttggg	aattgatagt	gaccctaaat	ataacaaaag	aatattgatt	tctaaagcat
88081	ggatcgtgtt	ggttcctaaa	aagttagtga	taatgtagca	attaaattct	gccctgtatt
88141	atacacagtt	ggtcagggtg	tcagcagaat	gccatcatca	ttattgaatt	gtgtaataaa
88201	tacttggggc	agagtgccat	agtggaaata	aaactacatt	ttggtttagg	acttcctgcc
88261	ctagcccatg	gcctatagag	ccaagccttc	acgtttcaag	aagttgtgag	gggaaagaga
88321	caggcattgg	cctcatggta	gcagctgctg	gagggttctt	ttcctagctc	attttctttc
88381	ctcatgtttc	acatttttcc	agggtgacat	cacgtgtggt	aactatttgt	atggatcttc
88441	caagcccgc	tttttagccaa	gacattttct	atgggctcca	gaccacaaat	ctggtggtca
88501	acatactctc	tacttggttg	ctccatagat	accctaagtc	aaggcatgaa	tatctaaact
88561	gatcgtgact	ctcctctctc	ccaccatcac	ctccaaacct	gtttcttttc	ctgcattttt
88621	tttttttttt	ttttgagatg	gagtctcgtc	ctgtcgcctg	gctggagttc	agtggcacga
88681	tctcagttca	ctgcaacctc	catctcccg	gttcaagcga	ttctcctgcc	tcagcctcct
88741	gagtagctgg	gattacaggt	gtgcaccacc	atgcccggt	aatttttgta	tttttagtag
88801	agacgggggt	tcaccatgtt	gttcaggctg	gtctcgaact	cctgacctcg	tgatctgccc
88861	gcctcagcct	cccaaagtgc	tgggattaca	ggcgtgagcc	accgcgccc	gcctttcctg
88921	catttctttt	gagcatctag	cacgtttcca	gtcattcatc	cacgtcagaa	agccccagat
88981	gccaccagct	cttctttgct	ttcaatgttt	aatggaacac	taaggctctg	gaattctacc
89041	tcacaaatgt	cttccctggc	gaatcctcct	ttctgtgcca	cccatcttca	ccttatttct
89101	ggccttcctc	atttctcacc	tggatctttg	taaccatggc	ctctagagct	ggctccctgg
89161	atccctactg	gccatcaatc	ccatgtgcct	cagccgtaat	gccagtcaca	gttctcaaag
89221	agctattctc	ttcctccctt	cctcattcag	gctgtgcctg	gtaatctgga	gtgaattttc
89281	cactccatcc	tgcagacttc	caaataactta	tccagaggct	cagcttacag	ctcaatgcct
89341	ctttgaagcc	tttctcaacc	tttgagaggt	tgagatataa	ctatgctgct	aaatgtaa
89401	ctaactcttc	atacatcttc	tcttggtttac	ctgtctcccc	ctcctgtcag	agtctgagtt
89461	acttgagggt	gtgaattgag	tcttatttat	gtctgtctct	aatatctagc	atgggtgtgc
89521	tcattgatag	cagacatcta	taaatgagtg	agtaagttag	ccaacgtgtg	ggtggttttt
89581	cctggggcgg	gaagggttgg	gagggtacca	cgtagttagt	gtgagcctcc	cttcgggctc
89641	tttgactttc	cgatgagcat	gcttactggt	agtgacttcc	cttgaccctt	accagttaga
89701	tacatgctct	gggaccagag	ctgcagaata	taaaccagta	gttttgaaaa	gttattatta
89761	tctccataag	gattgggttt	tttataggca	caggtaacaa	ggttgaacac	aaccaagtga
89821	accagtgaa	ttctatttat	ttcagttagg	tgtctgtatg	cactgtggcc	atcccagagg
89881	ccttactttc	aattcatatc	cactaactca	agggggcttt	actgccaccc	agcactcaca
89941	ccgccgtgct	cttctgcaga	gactttcccc	cagtctgttc	actgcttcat	actttctcct
90001	gcacttaaac	cttttagcata	tctccatccc	tgcctctcag	ctaaccgggg	ttgcaggcaa
90061	ttagaaagag	cttccctgtg	tacctgccac	cacatcttct	cagttgtctg	cactcgctgg
90121	ctagtctccc	ttgctgtgga	ggaattgttg	atgcccctgg	gaaggccaca	ccctccactt
90181	gaaagatccg	gtccctccct	accttttttt	tttttttttt	ttttgagacg	gagtctcgct
90241	ctgggtgccc	ggccagagtg	cagtggcacg	atctcagctc	actgcaagct	ctgcctccca
90301	ggttctcacc	attctcctgc	ctcagcctcc	cgagttagctg	ggactacaag	taccgcccac
90361	cacgcccagc	taattgtttt	gtatttttag	tagagacggg	gtttcagcat	gttagccagg
90421	atgggtctcg	tctcctgacc	tcgtgatcca	cctgcctcgg	cctcccaaag	tgctgggatt
90481	acaggcgtga	gccaccgcac	ccggccccct	cccacctttt	taagaacatc	actccatcag
90541	ttgtctcctt	tctcttctga	ataatcagtt	ttcccttggt	caccaagcta	ttcccatcag
90601	catacaaa	tgctgatttc	ttcccccata	ccatgcccct	ctccagcttc	catttatctg
90661	ctctgtttta	ctttgacttg	cctgaactca	ttataactta	ttcctctcct	ttcagtctct
90721	ctctttgcaa	agtttttaaa	gctttttaatt	ttggtaagac	atatacaaca	caacatccaa
90781	cttaccatgt	caaccttttt	tttttttttt	tttttttttt	tttgagatga	agtctcgctc
90841	tgtcacccag	cctggagtg	aatggcacga	tctcggctca	ctgtaacctc	tgcttccctg
90901	gttcaagcga	ttctcctacc	tctgcctccc	gagtagctgg	aattacaggc	atgtgccaca
90961	tgccctggta	atattttttt	gtatttttgt	agagatgggg	tttcaccatg	ttggccaggc
91021	tggtccttga	ctcctgacct	caagtgatcc	acctgccttg	gtctcccaaa	gtgccaggat
91081	tacaggcatg	agccactgcg	cctggcccat	ctcaaccatt	cttaagtgtg	caattcggta
91141	atgtcaggta	cattttacatt	attaagccac	caatctgcag	aatgttttca	tcttgcaaaa
91201	ctgaaattct	gtaccagta	aacattaaca	cctcattttt	ccctcctcca	agccctgggc
91261	aaccatcctt	ataccttcta	tctctgtaaa	tttgactact	ctgggtaatc	gtccattctc
91321	tcttgaaacc	accttcatca	ggctttttgt	cctacattcc	ccctccacca	cttttctcag
91381	ggtcacctgt	ggcctccact	tgctggatct	gacagtcatt	tctcagtctt	tggtgatttt
91441	ggcccggcag	cagctatagg	aacagtggag	cactccctcc	tctttgaaac	actgtcttca
91501	cttgggtttc	agggaccttg	ctggcctgtg	ttttccttct	tcctcacaga	ccactccctt
91561	ttagtgttct	tcctcttgtt	gcctctgtag	gttggaatgt	cccagggtctg	agtgcattggc
91621	cctcttctct	aatcttcaact	cactcctctt	tagagttgat	gtctttccat	gccatttata


```

91681 ctcttacagt tcccaacatt tgtcccgagg cccagctgtg aacacttccct tacctgcata
91741 tctaataagg gtctcaacat ttgcatctcc agaatagactc ttgacctgcc cccaatatc
91801 tgccataggc ttccacatct gaggatggca actccgttct tccaatttct gaggccaaaa
91861 ttgggaatca taattgacta ctctttttct ctcaaaccctc catccaatca gcaaattcag
91921 ttggctttac ttcaaaaaga tacaacctga atgtgaccac ttcttgtcac ttccactctg
91981 ccactcaggt ctaaccacca tcttacattg cttgggttgt cacctcctcc ctggcctccc
92041 tgccctgccct agattccaaa cacaatctta gcgagaagag cctatgaaaa tgtgagccac
92101 cctctgctcc aagccctcca gtggccagga aatggcagac ttttacagtg gccgaaagct
92161 ctatgtgatt gcctactcca tgacctcatt ggctctttt ctgtattttc tcaccttgt
92221 cccctcgctg gactccaca gccttcctct gtgtgcctgc agtatgccat cctgctgcta
92281 ccttagggct tttctgctct ctgtccctct ggggaaaggc tcagccctta aggatcccgt
92341 gccttcctct ctcttttctg tcagctctgc actcagctgt caccttggtt gcgaattctt
92401 ccctggtcac cctgtttaaa gttgccacgc ttctcccgca ctctgtagtt tttttttct
92461 tMttattttt ctctctagcR cttaccaccc tgtaacatgc cgtatatttt acttgtcatt
92521 tgtgtttgta tcacccact ggagggtgag ttctagagag cgggatttcc ttgccagcgt
92581 tcgctggatt tgcccactgc ttagaactat ttctggcgca tagtaggtac acagcaagta
92641 ttccttgaat gactatagag aagaagcttt caaaaacag aaaagcgtaa ttaattgccc
92701 acttcagcct cctaaactgt aggccttcatt tgaaatttca agttcttatt ttatccaaaa
92761 gagaacaaag ctgaattaaa cattgcttca aacgatattc ttgagtcgtt tccaagaagg
92821 atgtatagat gaaattataa tttagggtgc tatggatata tttatacata taaaatattt
92881 gtgacaaata tagtatttgt attatataca agaaaattac tatggatttg caaatcgatt
92941 catataaaat ttactttctt atgggacatt aaatatatta cagtagcttt gaattttctg
93001 aattatattt acttaaaaat gtcactggca atacctttga gggttacttt ttttgataa
93061 aacttgtggc aataattcct cctttgactt cttcagcaat atgttaaaac tggcacggaa
93121 cctttgaata gcttttgaat ttttatctcg tttgaaatta accagttact gatgtaatta
93181 ataccatatg gtataaattt tgaattctgc atgatttcta cttcaaaatg atgcctgctg
93241 ccttcattct actttatgtt taacacaagt atttgaaaaa cctgagtagt ggttatctgg
93301 cttagtggaa ctataattta ctgcaggtaa aaaggaggat tcatttcttt atgttggaag
93361 tctttaaaaa tatactgata catttccatc ccaaattagc aagtctgtta gagggacaat
93421 aattttatct ttgctaactg aagatcttac atggcctcat gcctaagatt atttactaca
93481 cattgtatca aaataaaaaa agtttgatat gccactaaaa ggctttttta aataggagag
93541 atctaataca tcacatacgt ggacgtgctg tttatactac aaaacctcta gatcctcttt
93601 acctttgcaa ggggggtggg tagttttggc tttccttatg tttttatttg ttatttgtga
93661 agtatataat aaaagaaaat ctaagaaatt gaggattatg gttaactgaa gtgtaataga
93721 ctgtttcacg gtatatttga cttcaacagc ttccagcaaa gaaaaatcct ggaaaaaaac
93781 tttctgggtt ggtcattttt attataaaaag gctttctatt ttccagcaaa gaacatttct
93841 tttatgggtt agagtttcaa tatttatgta attagcaact cacagcagtg ccttgtttca
93901 ttcttgattc taatcctgga atgataacat accagcaaaag cagcagccgt agcgtccaca
93961 gagcctactt ctctgccttt tttctgtctc cctgtagaga gaagtccact cttttctctg
94021 atcccagtggt agtaatgtaa atttgggcat gcagaaagtc aatgtgcctt agcatccttg
94081 ggattcattt tctttgcatt tccgaaatta ctcaccttgt agcagttgtc agatccctta
94141 attagtaact agttttcttt gaattatggg atcacataga ctgtctgtgg tctggctggg
94201 aagagactgt taccagctgc tcagctttag tcaggcaata aggtatttgt tacacttcaa
94261 ataatacatg gattttagtga aaggccattt gagctctaaa gcctcacagt ggaaagtttc
94321 tgagacctct gccctccctc tcacacccca gagaatccct agtctcctgc ctctctctca
94381 tgctatctgc atgattgctg ttggcctgct cggccaggaa gatgggtccga cacacacccc
94441 tgttcactgc ccagggtctc aggatccctg tcctaggcag agtcccaagc agtgttgtac
94501 ctgccaggaa gccctttggg ctcttctgca cccttgggga ccagtgtccc tacagtaatc
94561 tgtactcatg tttattccca tacttctctc tagaatttaa gtcattgagc gtgtgtctcc
94621 ctttctgcac tcagagagta tcagaggagg cctgggtgtc tagttatatt tcatttttca
94681 actgtcattt gttgaactcc agacactgct aactgctttg catgcacat cttacttctt
94741 cttcccagtg tttataagggt gcaactgaac caagccatat agttggcact gtgatgagtg
94801 agggaaacaga tacattgatc attgaatgga gctagagaaa actgttaagt aagttgacta
94861 ctaatttagt ggaaagagaa accttcaaac taacttacag attgttcaat tattgtacaa
94921 aactattatt tattttatttg tgtctcatgg aaccagtaa tagctaacat aatcatgata
94981 gcagttattc ttagagtgtc tcactctgtg gcaggcactg ctctaagggc tttatatgta
95041 tcatcccatt cagtcctttc actaattcaa tggagccagt actattaatg tctcatggtt
95101 acagatgcag aaattgaggc atagagaaat taagtaatta cttccaagtt catgcagcta
95161 agtgggtggg ccagagtttg aactcaagct gtctgacatg aggacctgga accagcctgg
95221 gtttccagca agataggaca gtgcccactc tgggctgggt ggaaacatgg cactgaagac
95281 atgggctctt tgttctggag aaaatattag ggacctggtc agagctcact tacttttagt
95341 aataaatatt caattcaacg aatattttat aagctcttac tgtacaacaa tgaacaaagc
95401 tcctaatact catggagctt acgttctagg aagggaagag agaaaattca catctatcta
95461 catgactaaa tcgcattgct atgttagaag gttattttat tgctaagata aaaagaaaat
95521 gtagaacaga ggaagaagggt taagatgggt atgaaagaag ttttaaggag atgatcaggg
95581 aagacctcat ggttcatatt ggagaattgt tgatcacatt tctgttgttt gacctgactt
95641 ctttgttgat ctcttaagag atgcaggctg agatcttgac tcaactcaaaa cttgtaggga
95701 actgcttaat atttctgcct atttaaccct ggaagcgttg ggttgtttgg tctgcagagt
95761 caggggtgag tcagcccatg ggttctgctt tattggctgg gtagcactcc cttactggRg
95821 ggcagttctg aatgtgtgcc ccatgggtgc tgagttatgg gctgggtggg gtgtctagag
95881 gagtgggaag tgagggtcag acaccgagga cattgcggag ctgagagagg aagttcagga

```


95941	tggatagaaa	gatgtagctg	cgattcttct	agagagaccc	ttgcctgcct	aggtgaagat
96001	agggatgaat	tgtccaaaga	gggcacatga	ccctagatcc	tacctctacc	caaggactat
96061	cttcaccaag	gcagtgggtcc	caggaagagt	agcaagaggg	tggagataac	agagcagccc
96121	cctcagtact	gggaaaacag	caggttccat	gcacttttgt	ggtgggcccag	ggcttttagat
96181	gagtgaatga	cagattcacc	ttttacccag	ttattgagac	atcatgagga	gtgttaagat
96241	tctgaaagta	aatttccacg	ataacatggt	tatgRtgtca	tttgggtcttc	ctctgtggaa
96301	ctggtaaatga	ttttgacttt	caagatgaga	tcttctcttc	tgaccataaa	acaagatggt
96361	gcaaacgagg	ttcccagctg	tcctgggtctg	tcggcatggc	tgctcgatgg	ctctggtggc
96421	tgataactca	ggatgttggt	gctggagagt	ggggaactcg	tccagatcct	cctgagacac
96481	cactttcctt	tttcatacaa				

SNW1 genomic sequence (SEQ ID NO: 6)

>14:76161051-76258200

1	aactcaagtg	atcctcctgt	gttggcctcc	caaagcaatg	ggattagagg	tatatgccac
61	tgtgcctggc	caaagcaagg	agtattaact	ctgggggttaa	tcttagctgt	actgcttact
121	tgatctgggc	attttagatg	agtcatttaa	tgtcttagag	cctcagtttc	tcacttatat
181	agtaacagta	gagtcaccca	aaattaaggc	aaaatggWaa	taagaaaact	taagcaggct
241	aattttgggt	ttcaaaacta	ctttttccta	tgacatcata	cctttccaac	ttcttatggg
301	gctgaatcat	gaaaggtgct	tgggtgtactg	aaatatcttg	agtcacaaag	ctatttactt
361	cagttagggc	taacagtaat	gcttttgaga	cacttgtata	gagttggtat	ttaaacagag
421	ctataaggaa	caccaagctg	gacaggggtga	gaaaatgaaa	agagaaggcc	ggtcgcagtg
481	gctcacgcct	gtaatcccag	cactttggga	ggctgaggca	ggcggatcac	gaggtcagga
541	gtccgagacc	aacctggcca	acatgggtgaa	accccgctctc	tactaaaaat	acaaaaatta
601	gttgggtgta	gtggcgggcg	cctgaaatcc	cagctacgag	aggctggggc	accagaattg
661	cttcaacctg	ggaggtgaaa	gttgcagtga	gctgagattg	tgccactgta	ctccagccta
721	ggaacagagc	aagactccgt	ctaagaaaaa	aaaaaaaaaa	aaaaaagaga	atgaaaagag
781	agtgcctgtaa	acagacagaa	aaaatggtgc	agtgagacac	tgggaatcct	gtctgctaaa
841	agtaaaagct	aaaaaatcct	gtttgccctc	ttctagatga	aatgtccaac	tgacgctaca
901	acttctgctt	ctgttaatta	cttagaaatg	aatttagtat	ttcaggggct	gaagttttct
961	ttgtatgtga	gtatctaata	gatggctcat	tacattgggt	aagagaccca	ctatgcagtc
1021	attgaagtca	aaacattaaa	ggaaaaaacc	tttattcttc	cctgaatagt	aaacctaggg
1081	tctgccttgc	cttaaaatat	atgaaacagg	ccgagcgggtg	gctcacacct	gtaattccaa
1141	cactttggga	agccaaggca	ggtagatcac	ctgaggtcag	gagtttgggt	ccagactggc
1201	caacatggcg	aaaccccgtc	tctactaaaa	atacaaaaat	tagccaggca	tggtggcgcg
1261	tgctgtagt	cccagctact	tgggaggctg	aagcagaaga	atcatttgaa	cctaggagat
1321	ggaggttgca	gtgagccaag	atcacgccac	tgcacttcag	cctgggtgac	acagtgagac
1381	gctgtctcag	taaaaaaaaag	tatatatat	atatatacac	acacatatat	acacacacaY
1441	aYatatatat	atatgaaaca	ttctctttga	aagagaatga	tcttttatct	tatcaacttc
1501	tccaagtgtg	gagattcctg	gacaaaatac	caaaagtttg	ctgatgtata	accagtctct
1561	ataataaaag	ggctatatga	aaccctctga	cagtactatc	agctgagttt	tccagggtacc
1621	taggcactgg	taaaacactt	ttaagcattt	tgtcatgatt	tctttaatag	gccatactta
1681	atactgcact	ataattcaac	acactctcag	aggtgatggt	agtggaccta	ttctatcata
1741	tgctaaactg	aacgacacca	ctgagctttt	ataaaagggt	ttctctttcc	tcccttgcca
1801	gactgttaac	caccactttc	cccaccagtc	tcacagctg	gcttgtaata	gtaacttctc
1861	ttaattacta	ctttaatctg	ctttgagctg	aggaactaaa	cacccaagct	ttcatgtact
1921	caacacatac	tgtacttagt	actgttttag	gtcctgtact	agacacataa	tggtcatttc
1981	cctgatggct	gacattctaa	aaagcatgta	catattatgg	taaaatgtag	gtaaaaggag
2041	ctgaatgaga	gtctgaagcg	ctctggagag	aaaaagtata	ttattattgg	ggtgtggact
2101	ttctgtattt	tgacaactct	aagaccactt	tttttcctta	acaaatgaag	gtgctgaaaa
2161	gctgagctca	agtatgcaat	cattaacact	taatactgta	gcatcccaat	tttatcagag
2221	ctgttaggaa	gcttggaag	aatgcctcat	ctagacatct	gtggacaaca	ccaagagcaa
2281	attaagggac	tgcatatcct	caacgttaaa	gtggattgta	aagaaagaaa	atataaattg
2341	gactacagtt	ttggttcccc	gttttccttc	ttgcctgtta	tgttccctta	aaaaaataat
2401	ttttaaaaaa	tctatttact	tgagaacagg	ttatgagact	ggctaatttt	ttgtattttt
2461	ggcggaaacg	gggtctctgc	catgccccag	gctgggtctcg	aaccctggg	ttcaagcgat
2521	ccacccgcct	cggcctccga	agtgcgggat	tacaggcttg	agccaccgct	cccggactgt
2581	gttccccttc	ttaatctcca	tggggaaaag	Ytgagagaga	gaacgggtgcc	tgtattccat
2641	atatacttgt	ttgccattta	ttttcaacac	ggagggattc	tcagaatcct	tcaatgacct
2701	ccttctaaaa	gagccagagg	agaagacagg	gactagtttt	acgcacagtg	gcttaacaaa
2761	cagcgccgca	tccctgtcag	ttctgggatt	cctcgggagt	ggtttttttt	aagctgcaga
2821	agtctaccct	accgtctaca	aagacgttct	atggggtttt	acaaaaaccc	aaacagaaat
2881	gtgaggagac	agttacagta	agaaataaac	acggattccc	aggctctttt	gactgagcgc
2941	ccccgccagg	aatggccgcc	taaagaaaca	ggcatctcaa	cgcttttattg	ctaagtgtga
3001	cggtttagtg	ggagttcgac	tctgcagcca	aaggaggtca	ggaatcgttc	aataacaatc
3061	ggtctggagg	tgaaaagagg	cgaagaagac	acgtaagtcc	ctccaagacg	cggggcaaag
3121	cgatggagag	acgcgcgcca	ctcctctctc	tgtacctttt	gggcaccagg	acccttgcca
3181	cgggctgcgt	gggcgcgcca	gaagtcgatg	accccttcca	ggtctgcggt	ccggggccgg
3241	ctctgacggt	agaagcggaa	aagtttccga	aaggcgtcct	ccccgggctc	agtcgccaga

3301	gtcgccacag	agcccacggc	cgctgccatc	ttcccccatt	cgcgccctat	accctctgat
3361	ccggaagcag	attctctcgt	gttccggatc	cggaaatttt	ttccggggcc	gcgacctcgg
3421	ctcgagaagg	tgcttttagtc	tgaagatggc	ggcctcagca	gcgagaggtg	ctgcggcgct
3481	gcgtagaagt	atcaatcagc	cggttgcttt	tgtgagaaga	attccttgga	ctgcggcgctc
3541	gagtgaagtga	tggagatgtg	ggagtagtgg	aatttttagg	tccaagtgat	cctcaaagct
3601	tctgcttttt	gcaggggtact	taagtcagcg	tgggtggctga	attaggagac	tgctcctgag
3661	catgcaagtg	agcagaaaga	aattttgttt	gcagttaacc	gtttagggat	gtcccttgag
3721	cttttggggt	cacgaatgca	ccggctcttg	cctttaggag	tgatttggtg	taaagattta
3781	ttacttggtg	accaagattt	acaatttaga	agggataatt	ttgactgtag	tgtggaggat
3841	ggattcaagg	tggcaagatt	gtaggcgtgc	agaggagcta	aaaggcaatt	tcattaattt
3901	acttaaaacg	tgaggacctg	aattagggcg	atggtagaag	gatgggtggc	agatgcatta
3961	atgtttttaa	agcaaattag	atgccgtttc	gtgatggctt	aagtgggaga	agtgtacgga
4021	ataaaggaaa	gggagaaatg	atttctgggt	tttttagcatt	ggatgaattgt	ttgttttagaa
4081	gttaggagca	ggccaagaga	agatgagtaa	agtttgaatg	tggtgacttt	gagaaacttg
4141	tgagggtttcc	gtcaggcaat	tggacaaagg	ttgtatatca	ttgtggctga	gaagtggact
4201	ccgaagctag	accgttgggg	ttagaattcc	aacttggcca	tttaatcggt	gttatcactt
4261	gaataactga	agtttagtatg	ggaaaagggc	tcacaactgg	gcctcagttt	actcatMgat
4321	aaaatggagt	caataataacc	caactcatag	gattgttgag	aggattgagt	ttatatgcaa
4381	acttcttaga	cttgtgttag	atacagtgtg	agtactcagc	aatgatagtg	tatttttcacg
4441	gtaactaaaa	ttgaaactta	cgggagaggc	ctagtctaca	gataaagggt	ggaataatta
4501	gttctgaaat	ctttcaccac	cttcaatttt	tgctcagctgc	agtttttgaga	tgagggttttt
4561	atatttgctt	accaacatgt	aaacattcgt	ggctcactctt	tttgtagata	ttcatgtttc
4621	aggtcaaccc	ctggaaacaa	aatggagcaa	gatttagttt	cttctaagtt	tttagtggct
4681	cagatgtgag	tagtagaatg	ggaaataggt	tggtttgtgc	cccRtgtttt	aaacatgtgg
4741	ttgggtgaaga	ccaagcccag	taaagtctcc	cgtagtccct	gtgaaacKtt	atggaaaggc
4801	tgaggagttt	cattagcatc	ttgcggatgc	aagtttccag	acaataaagg	gctagtttta
4861	aacctttaa	aagagtcagc	attatgtaca	gcttcgaaac	agtttctctt	tggtgttcca
4921	ttgattcagc	aaatatattt	ttgagtatct	attctgtggt	aggcattggt	cttgggtgctt
4981	gcagctgttt	ttccttcacc	atttttaggca	atttaggaag	agggttacct	tcagagctg
5041	gtttgttttg	aaatcagtg	cttctaggac	tttaattatc	tggtataaaa	catatgttta
5101	acattatttt	gttctccagt	atcataattt	gtgagacctt	gatcttgcca	gttggtttga
5161	cttaaccatt	agagcccttc	aaaatttagt	ctctgtggat	tKttggaagg	attagtggac
5221	ttttacttat	tcatttagcc	aatattgagg	ccctgctggt	tattgggtcac	tgtaaacata
5281	gtgggtttata	tgctgagggg	gcttacaatt	agtgggtggg	atgaagagac	ttagaacaaa
5341	tataggcaat	tggtgaacca	gtgagggttt	gggtgaactag	gagaactaaa	tagatattat
5401	aaaaagtaaa	tcagtgaagt	acaagcactg	tagttcagaa	gagaaacaga	tcgtgtagtt
5461	tttagtcttt	aagattatat	actctaaatc	tttgaagtct	cacagggctg	gtacattgtc
5521	ttgtactgtg	ataggagccc	aataaagtaa	tactcagtgg	atgtacttgg	tttgggtctt
5581	gaaggatagt	tatagtgtta	caagttagcc	agggggagat	aggattacca	acatatggag
5641	gggagagaac	aacatatgca	aagagggtaa	cccgcaggac	agataaagat	aattcaatta
5701	gttgtagtag	agagtaacta	ggggctagca	gtgggaaata	aggcaggaag	ggtaggtgag
5761	ggcaactcaa	cacatttttaY	taaattgtga	aagaccagta	agttgggatt	ttatttgga
5821	atcttcagta	taccgggaaa	cacactggat	tgtaatttgt	ctttttcttc	attgtgatct
5881	gtcacaggg	atcatagtc	acatagcaca	gtaactggta	tgaaaacact	cgatatttgc
5941	tgaggatgga	gactgcagcc	aactcaacaa	cttYtctgtc	catctcacca	ccaagtctgg
6001	tacattatgg	cttttatagtc	agtaccatag	ctgcttccta	aatcttaagc	ctttaaggaa
6061	atgcaaagta	gttctctgtcc	acaagaaatc	tgggtgacct	gtctttctac	agtctaagat
6121	agagaatcca	aaatatagta	actactttta	atgttttctt	ctgccacaca	ggtcagctga
6181	aagaacactt	tgccacagttc	ggccatgtca	gaagggtgat	tttacctttt	gtaagtatta
6241	aggaaaagta	gggtgggaggt	ggggatggct	aatgggtaca	aaaaaaatag	aatgaataag
6301	acctatttga	tagtacaaca	gggtgactat	gggtcaataat	aattgtacat	tttaaaataa
6361	ctcagagtgt	aattggatta	tttgtaactc	aaaggataaa	tgcttgaggg	gatggatacc
6421	ccataagtca	aaggataaat	gcttgagggg	atagataccc	catgctccat	gatgtgctta
6481	atttacattg	catgcctata	tcaaaacatc	tcatgtactc	cataataaat	atacatattt
6541	atatatataa	atatataaat	atatacacct	aataatata	aaatatatat	aaatatatac
6601	ccaaataaat	atatacacct	actatacact	cacaaaaatt	gttSaaaaaa	aagcttaaag
6661	tgtttttaaaa	aattcttatac	ttgcaacagg	gtctcgctct	gtccccctgc	aggggtgcag
6721	tggcctgatc	tcactgcagc	ctctgcctcc	caggcttaag	tgatcttcct	gccttggcct
6781	cctgagtagc	tgggactata	gacatgtgcc	accatgcccc	gctaactttt	ttgggtatttt
6841	ttagtggaga	cagggtttcg	ccatactgtc	cagactggaa	aattttttta	attttcattt
6901	tctttaagag	acagggtctt	gttctgtcac	cccagggtgga	gtgcagtgat	gcagtcagtg
6961	ctcactgcaa	cctctgcctc	ccaggcttag	gtgatcctcc	cacctcagcc	tcctgagtag
7021	ctgggactac	aggcatgcac	caccacacct	gggtaatttt	tgtatttttt	gtagagatgg
7081	ggtttcgcca	tggtgcttat	gctgggtctcg	tcgaactcct	gggctcaagc	tatccgcaca
7141	cctcggcctc	ccaaaatggt	gagattacag	gtgtgagcca	ctgtgctggc	ttatttttgt
7201	ggagatgggg	gtcttgccat	gttgcccagg	ctgatcttga	actcctggct	tcaagcaatc
7261	ctcctgcatt	ggcctcccaa	agtgtcggga	ttacaggcgt	gagccactgt	gcccggccta
7321	cagtctttat	tgattacatt	ttgagtgata	cttgattaaa	aagtgaaaaa	gctttatcat
7381	aggtatttgt	gttagttttt	ttattgttgt	ataacaaaa	accacaagcR	taatggctca
7441	aaaacaacac	atctctcaca	gctgagcaca	gttttagctgg	gtcctctcct	taggatctca
7501	catagctata	tattccagggt	gtcagctggg	gctgtgggtg	gtctcatcaa	agggtcact


```

7561  ggggaaaaag actgacttgc aagctccctc atgtggttgg caaaattcct tttttttttt
7621  ttttgagatg gagtctttct cccttgccca agctggagtt gcagtgggtgc agtctcagct
7681  tactgcaacc tctgcctcct gggttcaagc cattctcctg cctcagcctc ctgagtagct
7741  gggactacag gcatgcgcca ccacgaccgg ctaatttttt tttttttttt ttttttgaga
7801  cggagtctca ctctgtggcc taggctggag tgcagtggcg cgatctcggc tcaccacaag
7861  ctctgcctcc tgggttcacg ccattctcct gcctcagcct cctgagtagc tgggactaca
7921  ggcgccccgc actacgcYcg gctaattttt tgtattttta gtagagatgg agtttcgcta
7981  tgttggccag gctggtctcg aactcctgac ctcaagtgac ccgccccgct gggcttccca
8041  aaatgctggg attacaggtg tgagccttca tgcccggcca taattcatct ttaaYttag
8101  gactgaggtc tgttttcttg ttgacctttg gctctgagtt gggagctgct ctcacctagg
8161  aactccctgc agttccttgt taMctagttt atctgtaggc tgtcttacia tatggcagct
8221  tgcttcttta aagccagcaa gggcttctcc agtctgctta agatggcatc ttatacagaa
8281  cataatcaca ggagtgcacat cccttacttt tYgctgtatt cttttggtta gaagcaagtc
8341  aggtttctcc tMcacccaag gaggggagga gattatatag ggtgtaacat ggggaatgca
8401  tggagatcat ggggccccatc ttagaattct gcctactaca gtattctaata aaggacttga
8461  gatttctaata aattggcaga ggataatttta agttttatct tcattgagta ccattttctt
8521  ttttagattt ataactaata aaacaatatt tttatattaa ttacatttcc tttgctttct
8581  tgtgaggggt tagaaatcag cctataaatt tatcctgggc tgtatttttc tgtgggcttt
8641  tttaggggtg gatgtgagta catagagttc acacacactt cactgaaacc cttttttcct
8701  tgcagcactg taagggtctgt ggtaaaataa caacataaag gaacttaaat tcttaattct
8761  tggtttaatg ttacttgact cccaaagact aacagattag ttatatatag tgccggtgaa
8821  ggtgtaggga atctggcact caagtgtgtg agaagttcaa ctggtacctt cagttctggt
8881  gtgtagttgg caaaatacca aagttaagaa tttatatttg ctttgatcta gcggttactt
8941  ttctaagaat ttatcctaca gaaatgtgtg gtcaagaata ttccaaagca gcattattta
9001  atgtcaagta agaagaagaa acttaaattgt tcatcactgg gattgattag atattaagtc
9061  actgatgcaa tggaatttta tatagttgaa tagaaaagtt gggcacatgt attatggaca
9121  tgaaatattt tctgtaagtt tgaaaacttc aatttttttca agagcattta aataaaaagt
9181  tccttgcaaa aaaatgaata gattttttatt ggtccataaa taaaatagga cctgcaaaga
9241  atagatctta gatttaataa aaaggcggct ttgatgttgg taaaacaaaa taaaatatga
9301  caaaaaaaat atttttttgt tccattcatt gtactctagt tggaaatYct ggttcctttt
9361  ttgagacagg ttctctcNct cactcaggct ggagtgcagt ggcacaatca agttcactgc
9421  aggcttgaa ccttggttcc aagggatcct tctgcctctg cctcctgagt agctgggatt
9481  agtcgtgtgc caccacacct gactaatttt ttgtactctt tgtagaaatg gggcttcacc
9541  atattgcccga ggctgggtctc gagctcccg c actcaagcag tctactcacc tcagctccca
9601  aagtgtgtgt attacaRgca tgagccacca cacctggact gagttatttt ttttgagaca
9661  gccttgctct gtgcgccagg ctggagtgca gaggcgtgat ctcagctcac tgcaatcgct
9721  gcctccYggg ttcaagtgat ccccttctct cagtcacca gatagctggg actacaggca
9781  tgggccacca caccagcta atttttgtat ttttagtaga gatggagttt cacYatgttg
9841  gccaggctgg tcccaaactc ctgacctcaa gccatccatc cacctcagcc tcccaaagKg
9901  ctgggattga gccactgcac ctggcctatg ttttaataata aacaaatttc ttaatgcctt
9961  tgactgtgga agtggtcaca tgacaataaaa ggaatgcttt agaaattggt gtatctacaa
10021  tgaatggatc attgggacat caccagaaac tttccgtctt ctaggttaat cttataaag
10081  ttatccttga agtagaggag caattgtaag attttgtttt ttttggcaaa gcacagcatg
10141  acttgaatga gactaatgag gaccagtttg tcatctacag ggactagaca tottaatatc
10201  tgttttctgt Ygaagggtc gaggggcagg gtacatccaa gcactctaga atctgttttc
10261  cgtatgcgat gtataggttg aaacttttgc acaagggaaa atagcaaaat tgtttaaatt
10321  aaccagaagt ctgtaactag gttgagtaag ggctaaatat tatcttttct tgttttNcat
10381  taggaacacg tgatgatagt cgtggtggtg gtgaggggtga ctggattcag aaatgagtgc
10441  aacaaggctt tgaggcttaa ttttctagtt tctagaaacg aagcttagaa caagagtact
10501  gatcaaaatt tcccttagct attactgtta gtatggtttg catctagaat gacacagaaa
10561  gctcatgacc cgtatcttct ctaatggcag caaggaaaac aggaagctta acaacacagg
10621  gatttagcct tgggtaataca ggaagggtgt aaagcaagg tactgacact tataaatgtc
10681  tgtgatccga ttttYggctg ggcattggtg cttatgcctg taatttcaSY actttgggag
10741  gccagatgg gaagattgct tgagcccagg agtttgagac cggcctgggt aagatgggaa
10801  gacccatct ctgcaaaaaa tataaaaaat gaggcagaca tgggtggtatg tacctgtgat
10861  ccagctact gaagaggctg aggtgggagg attgcttgaa ccaggaagt tgaggctgca
10921  gtgagttgcg ttcataccac tgcacccag cctgggtgac agagcaagac cctgcctaaa
10981  aataaaataa aattaaatta aaaagtccga tttttggcag atgaaaaagt tggtagtttg
11041  atttggaact catggaaact ttctgaagtt catgattaat cttttcctat attttgaatt
11101  tttaggacaa ggagactggc tttcacagag gtttgggttg ggttcagttt tcttcagaag
11161  aaggacttgc gaatgcacta caacaggaaa atcatattat agatggagta aaggtaaatt
11221  tatttctatg ccagatacat acatgatata catgtaggta ctatttaatt atgtatcaat
11281  taaatagatc ataaatgtgg aatgatgggg acttgagag atttgtaact gaagctgcct
11341  taatgcttgt taagaatggt ggggtggagg ctgggcacgg tggctcacgc ctgtaatccc
11401  agcactttgg gaggcgagg cgggcggatc acRaggtcag gagatcgaga ccatcctggc
11461  taacacggtg aaaccccgct tctactaaaa atacaaaaaa ttagcctggc aagggtggcg
11521  gcgcctgtag tcccagctac tcgggaggct gaggcaggag aatggcgtga accccagggg
11581  gtggagcctg cagtgcgagc agattgcgac actgcactcc agcctgggag atagcgagac
11641  tccatctcaa acaacaaac aaacaaaaca acaacaaaaa aagaatggtg cgggtgtagg
11701  ccaggcgagc tggttcatgc ctataatccc agcacttttg gaggcgagg cgggggggat
11761  caccagaggt caggagtttg agaccagcct gaccaacatg gagaaacccc atctctacta

```



```

11821   aaaatacaaaa   aaaaattaga   tgggcggtggt   ggcacatgcc   tgtagtccca   gctactcagg
11881   agactgagggc   aggagaaccc   aagagacaga   ggttgccagt   aactaaaatc   gcgccattgc
11941   actccagcct   Sggcaacaag   agcaaaactc   catctcaaaa   aaaaaaaaaa   aaaaaaatg
12001   ggggggtggt   gagtgcccag   ttttaaaagg   tccaggaaag   tacaagatga   ccctttaatg
12061   ggtagcaaga   tatgtaacac   agtggacata   acagtctact   tttctttttt   ctttttgaga
12121   gtcttgctct   tgttgcccag   gctagagtgc   aatggtgcaa   tcttgatca   ctgcaacctc
12181   cgcctcctgg   gttcaagcga   ttctcctgcc   tcaacctccc   gagtagctgg   gattacaggc
12241   atgcgccacc   acgcaactgct   aatttttttt   gtattttttag   tagagattgg   gtttcatcat
12301   gttggtcagg   ctggtctcaa   actcctgacc   tcaggcaatc   cgcctcctc   ggcctcccaa
12361   agtgctggga   ttacaggcgt   gagccacagc   gcctggccag   cagtctgctt   ttcaggtcag
12421   gcaagctggg   gctgaaatct   tggcttacc   accatgtgat   cctgggcca   actgatttac
12481   tattttat   taaatttttag   ttttaatgag   acagggcctt   gctatgttgc   aggggtggtg
12541   tgaactcctg   gcctcaagca   atcctcctgc   ctcagcttgc   caaaatgctg   gcattacagg
12601   cctgagccac   tgcccctggg   ctgatttaca   atttttaatt   gaggggtagg   gagtcataat
12661   accaacaag   atggtaaaag   gaatttgagg   agaaaaYgaa   agaacaagg   acaataaaa
12721   actgcctggg   ttattcatta   ttcatactga   ctccctaata   aagtgtttt   cagtttgaat
12781   gtttttgag   acattgcctt   tcctcctta   cagtgcctat   ttttttaagg   tccaggttca
12841   cactagaagg   ccaaaacttc   cgcaaacatc   tgatgatgaa   aagaaagatt   tttgagactg
12901   cagcctatta   ataaagttaa   cataactgag   aattttgtct   aaatgtttt   atttgaaca
12961   aatagttgca   ccaagcaaga   gKttactttg   cccactccaa   attaaaacag   agcacaatag
13021   gggcaaaatt   tatttggcag   gacagttcca   gtatgtgaac   atcttcctcc   tcaactgtgt
13081   tggggtaact   ttactcatat   gcagctgttc   ttacacaaaa   cattaacccc   aaactactag
13141   tgtcacataa   aagtaagtgg   tcttgacttt   gtatgtgggg   cagcatgttc   tataaatgct
13201   gaaaggtggg   agaagcaca   acacaacca   ctctttaaaa   aaaactaat   aattcaaagt
13261   agaattttct   atcccccca   tttctccagt   aataaaaagt   agtgctggga   tctggcacc
13321   agatttggtt   tttatcctga   ccatttaca   agtgttcccc   catatgactt   gcacattag
13381   ggttatgggt   aagagttcat   tcactttgga   gagacctgtg   cctattcctt   cctcctcttc
13441   ttgccttcat   gctcgtgttc   cttggggcgg   ctgctatctg   agggctcttt   agagccacca
13501   tgctgttttg   cttcttccaa   aaacttgtcc   aaaccaaaag   gatcttcctc   aaactgcact
13561   ggtccttctc   ggctcctctg   tctacggtct   gaaccagaaa   actccttgtc   gggaacaaat
13621   ctaaggaaaa   ggagaaaaaa   ctatgaacta   ctttgctttc   accagtgtaa   aactgaaat
13681   tgagttgtat   ggcttgccac   ctggtggtct   ttattctggc   ttctaggta   tcaccataca
13741   tgccttctgc   cagattttta   ctgggcctat   aaatactctg   ggccatatct   ttaccacctc
13801   tccaggcttg   atcataaaca   ttataaat   catcttctcc   acctgcaaat   ccaactgtcca
13861   taccctgtgg   aaaaatggat   gacatttaat   aaaagtgtaa   acattgttta   tcaaaagctg
13921   aatcataaca   tgtttacagt   aaacccttgc   taatgtacag   ctacattttt   caacaatctg
13981   aactgcaaat   taaaaagtct   tcattaaaaa   actggtagca   catgaacttc   ataacaactt
14041   tggattcttt   tttttttttt   tttcagacag   agtctcactc   tgtcaccag   gctggagtgc
14101   agtggtgtga   tcttggtc   ctgcagccac   cgcctcccag   ttccagtgat   cctcctgcct
14161   ccgcctccca   ggtagctggg   attacaggca   tgtgccacca   caccagcta   atttttgtat
14221   ttttagtaga   gacagagttt   caccatgttg   gccaggctgg   tcctgaacc   ctgacctcag
14281   gtgatcgct   gccttggtct   cacaagtg   tacatagctc   actggagctg   tgacctcct
14341   gtgctcagg   gttcctccca   cctcagcctc   ccaagtagct   gggagtacag   gtgtgtgcca
14401   ccatgtccag   ctaattttYt   gtagacagg   ttttgccata   ttgcccagg   cggctttaa
14461   ctgggttcaa   gcaatctgcc   tgcctagg   tcacaaagt   Ytaggattac   aggcgtgagc
14521   cacagtgcc   agccagaaat   attttcatca   caatttttaa   atgttttaag   cttaagcttc
14581   taacagggtga   ttatcttgaa   aatatttact   tacgtgaaat   ttcacccta   gatcccttg
14641   ctgagctgg   aagttgccat   tgtatagtgg   ttaagaaagc   tttgaaattg   gctgggcaca
14701   gtggctcacg   cctgtaatcc   cagcactttg   ggaggccaag   gcaggaggat   cacgaggta
14761   ggagttcaag   acccgcttga   cccaacgtga   tgaaacctg   tctctactaa   ggatacaaaa
14821   attagcctgg   catggtggca   catgccctgt   gataatccca   gctactcagg   aggctgaggc
14881   aggagaatcc   cttgaacctg   ggagggtgg   gttgcagtga   gccgagatgg   caccactgca
14941   ctccagcctg   ggcgacagag   tgggactcca   tatcagaaaa   caMaaacaaa   caaaaaaac
15001   tttgaaatca   agacaccag   tttgaatctt   aattccatca   gtcacaagct   aaacctgtgt
15061   ttcaatttcc   tcatctataa   cataagagat   aatagtatta   tttcatagga   tttttgtaag
15121   aattgagata   ataacaagac   ttagaacaat   gccagaata   taaaatgcat   ctaataaatt
15181   atcacttaga   agagcttact   taaaacctcc   aagtcataat   taagtctccc   actctacttt
15241   ccagtagaac   ttacacttct   gtattcttgt   gtgtgcgcaY   gcgcccgcgt   gtgttttccc
15301   aggcttaaag   tgtcctagt   agctaattgg   aattggtact   agaaatcaga   tttcctgaca
15361   gccagcctag   tactttaatc   ccgttttaca   gcttcatttt   taaaagaatc   ccaaattgat
15421   atatctctat   agcattaaaa   gaaaaatcca   aaaatcaaca   acaaaaaaac   ccaaRaggca
15481   cttttgtagg   acactgactc   ttttattttt   ttgagataga   gtctcagtca   ccaggctag
15541   agtgccagt   cacaatcttg   gctcaccaag   caattctcgt   gcctcagcct   cccaagtagt
15601   ggggattaca   ggcgtgcacc   accacacctg   gctagttttc   gtattttttag   tagagatggg
15661   gtttcacat   gttggccagg   ctggttgtga   actcctgacc   tcagggtgat   tgcccgttc
15721   ggcccca   tgtgttggga   ttacaggcaa   aagccaccat   gcctggcctc   cctgggttcta
15781   ttttagaaac   aaaagggtga   cataccacaa   caccaagttt   ttaatcacct   aatttcttct
15841   ttctcctagt   gtctcaaatc   tcagccact   ataagaagt   aaaatcaRaa   ctgtttcatc
15901   ttgtctcaag   tttcaacata   caacttccaa   ttttttgtc   atcatgctgg   catttacatc
15961   caaatgtaaa   gtatgWtaat   tttcgtttcc   ctgaggatag   gtattcacat   caacacacac
16021   aatatgctgt   tcctaaactt   gtaccttgga   ttggttgaag   agcctttggt   catactgaac

```

16081	ttcattggaa	gtccgaggat	taggaacacc	gagagcaata	acttcactga	tatcccgatt
16141	ttcatttctc	tgaagtttcg	acctattttg	aaatacgaca	tcactaactg	aaaactcttt
16201	atagacaagc	tgaatatgtt	caatagaaat	acaaccaatc	tcagaaacaa	aggatgtgaa
16261	tatgtcacat	tcacatcttg	tgaacatata	ttccttgatg	atacatMatc	aagctggcag
16321	cccttataaa	gcatttcaga	ttagagggag	agtttttaca	ttaggacgtc	ctgttagctc
16381	aaaagaacat	ctaacagatt	cgttgacatg	gaattcttta	atataagcaa	tcaccttaca
16441	aMcatgctga	gatataaaat	tgctatggtc	tatatcttact	atcattatat	gatgggttgg
16501	gggttgggga	agtggataca	athtagatgt	agcacacgaa	acatttttaa	taagctagaa
16561	acagctcttt	tatctaacca	catttagtaa	ttttatccca	ctagaatttt	gaggaaaaca
16621	tgtcaatgac	tgaattagta	tgatttttga	cattcagatt	aatttggttt	cctggctggt
16681	gcattatata	tgcaacctac	atcccaatga	aaccatggta	actgtcatta	cttgttttac
16741	taaaaactca	ggtcacaaaa	tgattttctat	aggctgtttg	attttcatcc	agttacaatt
16801	tcacagcttt	tctatgttgt	caattctgat	agccacttta	ctcgttttga	gggcccatt
16861	tatccacaga	gccattgtaa	ctttttacaac	ttaggaatta	ctaaccaaga	ctgtcattaa
16921	ttaaacactt	tcacactttg	ctcctccttc	tacatgtact	ttaccctcaa	ctctcaagag
16981	taagagtctt	tgcttctcca	tgacatcatt	tatccaggga	gatgaaatat	gccaattaat
17041	accagcagga	atctttttca	tgcttattta	tttttatttt	tttatttttt	attttttatg
17101	acacggagtc	tcactctgtc	gcccaggctg	gaatgcagtg	gcacgatctt	ggctccctga
17161	aacctccgcc	tccagggttc	aagtgattct	cccacttcgg	cctctcgagt	agctgggact
17221	accggcatgt	gccaccacac	ccagctaatt	tttgYatttt	tagtagagat	ggggtttcac
17281	catgttggcc	aggctggctc	tgaactcctg	acctcaagtg	attcgctgct	tttggcctgc
17341	caaagtgtct	ggattacagg	tgtcagccac	tgtgcccggc	ctcttttttg	tgtttaaaat
17401	atgacttgaa	aaatgtatta	ggctcatggg	atgatcagag	cacagaaaac	tgttcatttg
17461	ggaagaaaat	attctatatt	tgcatttaac	cctcactcag	aattccacct	tagtattgca
17521	gcgttccctc	tacttttcag	aacttttagt	cctcagcctt	tggtgagcca	taaacttccc
17581	caattcctac	tttactctat	gccctcatat	atataatttag	tttgttctat	acgtttatac
17641	ttactaagag	tgctttgcaa	attttctcaa	attattttat	ggatagctct	gtctttctga
17701	actgtaagtt	aaactactcc	taaaaatgag	ctgattttct	acttctttca	aaactgctct
17761	tctcctcaat	tgtactagat	gcagtactat	gcatataaaa	tgatctcaat	aaaagcatga
17821	aagcttattt	cctgtctaaa	gaggcacata	atccatttat	ctcaccattt	gaggtagaaa
17881	aagaacggac	tataacagtc	caaatttact	actacatcct	tttcaaaaat	ctgatctcga
17941	ttccgttttc	tatatcccca	tcattctcaa	ttctgactta	agtgatggaa	gattaattcc
18001	aaagacagtc	aactagagct	aagacaaaagt	agttaagtac	aagaaaatta	agtgctaatt
18061	tattaagtta	tcaaactaaa	gaagaaaggg	agagaagcaa	aactgatctt	agtggactaa
18121	aactctgctc	taaaagggtac	aaaaaggcca	ctcttcatga	ttggtacata	tctttttttt
18181	tttttttttt	ttttgtgaga	tggagtctcg	ctctgtcgcc	caggctggaa	tgcagtggcg
18241	tgatctcggc	tcactgcaag	ctccacctcc	cgggttcacg	ccattctcct	gcctcagcct
18301	gccaagtagc	tgggactaca	ggcgctgccc	acgaccatgc	ccggctaatt	ttttgtactt
18361	ttagtagaca	cagggtttca	tcgtgttagc	caggatggtc	tcgatctcct	gacctcgtga
18421	tccgcccgc	ttggcctccc	aaagtgtctg	gattacaggg	gtgaaccact	gcgcccggcc
18481	accatgattg	gtacacatct	taaataacac	ctacctctta	tcaggagctg	ccctggaaag
18541	attccggtca	tgctgtctct	cttttcgcct	gtcatgcggg	atttcatccc	tctcacgtgc
18601	ctccccatcc	tctgtgtgaa	cagttgaaaa	gtacttcact	gtaatatgta	ttatatgtgt
18661	gcatacgtgt	acacgtgtgt	atataataaa	tttttttaaa	agagacagca	tctcactctg
18721	tcacccaggc	tggagtgtag	tagcatgaac	atgggttact	gcagccacta	cctcctggat
18781	tcaagtgatc	ctcctgcctc	atcctcccga	gtacctggga	ccacagatgt	gtgccaccat
18841	gcctggctaa	ttttttaaatt	ttttgtaaag	atgggggtccc	acttatgttg	tcgaggctgg
18901	tctcaaactc	caggctctag	tgatcttccc	acctaggcct	cccaaagKgc	tggagtcaca
18961	ggtgtgagcc	actgcactca	gccccattag	tattttgttt	gttttgagac	ggagtttcgc
19021	tcttgctgcc	caggctggaa	tgcagtggcg	cgatctcagc	tcaccgcaac	ctctgcctcc
19081	cgggttcaag	cgattctcct	gcctcagcct	cccaagtagc	tgggattaca	ggtgtgcacc
19141	accatgcggg	gctaattttt	tatttttagt	agagatggag	tttcaccaag	ctagtctcaa
19201	actcctgacc	tcaagtgatc	tgccgcaccc	agccaatatt	ctgaacaaga	gaatattttt
19261	taaccttaga	aaattccaaa	cttcttttga	gtcacactca	gccttttaaa	ccttacttgc
19321	aattaattta	agtctaataa	atgatattag	tttaattttt	gaatgtgaat	tctagaatca
19381	agcatgcggc	taaaatatatt	aagggtaaaa	tgtattgctg	tcttcaactt	acttWgaaat
19441	gcaatgcagt	aaatcggaca	gacagatgga	cagaaagatg	ggcaaatatg	tgataaagca
19501	aatttatcaa	tgtaatttgc	tttttaaaatt	tatttttgat	atataatcat	tatacatatt
19561	tatgggggtat	atataatttga	tacatgaaca	aaatgtgtaa	taatcaaatc	agggttaatta
19621	ggatatccat	cacctcaaac	atttgtttgt	gttggaaca	ttctaaatct	tctagctatt
19681	ttgcaatata	caataaatta	tcattaacta	ttcttctctt	ctagctattt	tgcaatatac
19741	aataaattat	caYtaactat	tcacccctact	gtactaggaa	cattagaact	tactctttct
19801	aactgtattt	ctgtaccatc	aaccaatctc	tcttcattcc	ctgtcccca	catccttccc
19861	aaccactgg	aaccaccatt	ctactctctg	cttctctgag	accaactttt	ttagctccca
19921	catacaagtg	ggaagattca	gtattcgttt	ttctgtgccc	ggcttattca	cttaataacc
19981	ttcagttcca	tccatattgt	tgcaaattac	atgatttcat	YMtttttttat	ggctgagtaa
20041	tatcccattg	tgtatataga	ccacattttc	tttatccatt	caccactggg	acacaacttg
20101	attccgtatc	ttggtaactg	taaagagcac	tgcaataaac	atggaagtgc	agatatccct
20161	ttttgatattg	atatactgat	ttcctttttg	atataataccc	agcagtgaat	tgctggatca
20221	cgtagtggct	ctatttttcag	ttttttgaag	aactgccata	ctgttttcca	tagtggctgt
20281	actaatttat	attcttacta	aaaatgtact	agtgttcccc	cccttctgta	tctcgcgcag


```

20341 catctattat tgccttttta atgatagcca ttttaactgg agtgacataa tatctcactg
20401 tgggttttgat ttgaatttcc ctgatgatta gtgatgctga acattttttc atacacctgt
20461 tggccataag tatgtcttct tttgagaccg tctattcaga tcRtttgccc attttaaaat
20521 cagattatct cgtttctttg cgattgagtt cttgtacatt ctgggtatta attctttctt
20581 aaatggataK tttgcaacca ttttcttcca ttctgtaggt ggctcttca gtctgttgac
20641 tgctgtgcag aagcttttca gcttgacgca atcccatttg tctatatttg cttttgctgt
20701 ctgtgctttt gagattttac ccaaaaaatc tttgtccaga ccaatgtcct gaagcatgtc
20761 cccagtgttt tcatctagca gtttcatagt tcaggcctta catttaagtc tttaatccat
20821 tttgatttga ttcttgtatg tgataagaaa taagaggtct attttcattc ttttgcattg
20881 gactattcgg ttttcacagc attatgtatt gaagagacta tcctttcccc aatgtatgct
20941 ttgggcatca gcgttaaaaa tccacgcatt ggctgggcat ggtgggtggt catgcctgta
21001 acgcactttg ggaggctgag gcgggtggat cacttgaggc caggaggttg agaccaccct
21061 ggggtgtaat gcaaaaccct gtctctaaaa taacacaaaa attagccagg cgtgggtggtg
21121 cgtgccttag tcccagttac ttggggaggcc aaggtgggag gatagcttga gtctgagagg
21181 cggaggttgc agtgagctaa gattacacca ctgcactcca ggctggatga cagagtgaga
21241 cgttgtctcc aaacaatcaa aaattccatg catttatagc cgatccattt atttctgggt
21301 tctctattct gttccactgg tctatgtgtc tgtttttatg gcagtaccat gctgctttgg
21361 ttactatagc cttgtagtat attttgaagc caggcagtgat gatgcctcca gttttttttc
21421 tttttattca ggattgcttt ggttatttgg ggtcttttgt ggttccatac aaatttttagt
21481 attgtttttt ctatttcttt gaagaatgtc atttggtattt tgatagggat tgcattgtgt
21541 ctagagctag ctttgggtag tatgaacatt ttaacaataa taatttttcc aattcatgag
21601 catgggctat ctttccattt ttagagtgtc ttctacaatt tctgttttta aaatttaatt
21661 ttttttcttt taaaaagaga tagggcttta ctgtgttgcc cagggtggtc ttgaacacct
21721 gacctcaagt aatccttctg ccttggcctc ccaaagtgtt gggattacag gtgtgagcca
21781 ccatgcccag cctcttcaat tacKttcatc agtcttttat cattttcttt gtggcgatct
21841 ttcacttctt tgggttaagt tattcctagg aggtatgtg cagtgactca tgcctgtaat
21901 accagcactt tgggaggcYg aggcaggcag atcacctgag gtctgagacc agcctggcca
21961 acgtggtgaa accccatctc tcctaaaaaW aaaaaaaatt agccaggcgt ggtggtgtgc
22021 gcctgttgct ctagctactc aggaggcggg gacacaagga ttgcttgagc ctgggaagcg
22081 gaggttgca ggtgtgaga tcatgccact gcactccagc ctgggtgaca agagtgagac
22141 tccgtctcaa aaaaaaaaaa cctttattcc taggtagttt ttggtagcta ttataaatgg
22201 gactgccttc ttgttttttca gcttgggtat cctatttcta tatagaaatg ctacagattt
22261 ttgtatgttg gttttgtatc ttgtaatgtt actgaattcg tttatcagtt ttaagttttt
22321 tgggtggcatc attaggtttt tctaaatata ggatcatact gtctctgaca aagtataatt
22381 tgatgtcttg tttttttttg tttttgagat gRagtcttgc tttgttgccc aggctggagt
22441 gcagtggcat gatctcagct cgctgtaacc tctgcctcct gggctcaagc aattcttgtg
22501 actcagcgtc ctgagtagct gggattacag gtgaaYgcca tcatacccag ctaatttttg
22561 tatttttagt acagacgggg tttcatcatg ttggccaggc tggctctgaa ctctgacct
22621 caagtgattg cccatctcag cctcccaaag tgctgggatt acagggtgtg gccactgtgc
22681 ctggccttcc tttccaatct ggatgccctt tatttctttc tattgcctaa atttctctgg
22741 caaggacttc cagtcccatg ttgagttaca gtggtgaaag tgggcatcct tgccttcttc
22801 cagatctctg agtaaagact tccaatgttt ctccattcag tatgtcagct gtgggtttgt
22861 catatatggc ctttaagtatt tttagttatg ttcttcttaa gccactttg ttgagagttt
22921 ttatcatgaa gggatgttga attttttcaa atgctttttc agtttctact gaaatgatgc
22981 tatggttctt attcttgggt ctattaatgt gatgtatcac atttactgat ttgcatatac
23041 tgaaccatct ttgcatcctt gggatgaagg atagttcagt tgattatgat gaatgatatt
23101 ttttaatgtg ttgaaatctg tttgttagaa ttttgtttag gatttttgca tctaagatta
23161 tcagggatgt tagcctgtgg ttttcttttt tgttgatata ttgtctagtt ttggtgtcag
23221 tatactaatt accttgtaga atgaatttgg aagcattccc ttctcttcaa ttttttggaa
23281 tagtctgagt agaactggta tttagttctt taaatgtttg gaaaaattcg gcagtgaagc
23341 tgtcaaatcc tgagcttttc tttcatggga gcaatgttaa ttgttaaaaa aaaaaaaaaa
23401 attagtgtag aatctagggt gtaggagata cRggtgttca tcatataatt ctttcagctt
23461 ttctgtgKgt ttgaaaatgt tcataataaa atgtcaggaa aggctgggtg tgggtggctc
23521 tgccgtgtaat cccagcactt tgagaggctg aggcagggtg atcacctgag gtcaggagtt
23581 tgagaccagc ctggccaata tggtaaaacc ccatctctac taataatata aaaaattagc
23641 tgggcatggt gatgggcacc tttaatccca gctacttgga aggcttaggc aggagaattg
23701 cttgaacca gaggcgag gttgcagtca gctgagattg catcattaca cttcagcctg
23761 ggcaacaaga gYgaaactcc gtttcaaaaa aaccataata taataataat aaaaaagtca
23821 gaaaaaagga attatgcata atgtttccct tatattttca aagattctat tgaataaaga
23881 actgtcagct tatttccctt aggggctggc tggatcttga tttccactgc atttatactt
23941 atcttcattt ttttctaccc tcgccagtct gaggggaatg agtacagtta agagcataag
24001 atttggagca agcctgtctg gattcaaatc ctgtttctat agccaattaa ccatgtgacc
24061 tgccgagatt acttaatact ataagcctta gtttctctct ctgtaaaaca gtcacaataa
24121 tagtatcact acataggggt atcccaggga ttatgagata atgcaaataa agtactcaga
24181 gtgggtgccc ccataagaag cacctgataa atgttagttt ttactactat ctggcaagag
24241 attcattaaa attttttaatt tcttgagaac gattctgttg tctttttctt attagtttag
24301 agaactcaaa tgcagtaagt tttaYttcta attatcttct atggttaggt atacaaccag
24361 gcaggtaatt atatctcacc ttattaagtc attcatatat aactgaggga agtggatcac
24421 tacttaaaac cctggttatt tccctatggg tgaactctag actcttgtaa ccaattacct
24481 ggcacctcca tcttaaaact aacatatcct taactataat aaattcttca tctttccctc
24541 ccaaacctgt tcctcctgca gtcttcccaa tattagtaaa taaaagtaat atttactttt

```



```

24601 atcctgagca attggcaatt taatccttcc caactgctta ggataaaaagt tctggagtca
24661 tccttaactc ctactttttt tcgtatctcc acctaatcca caaacaaatt ttgtcaactc
24721 tactaccaaa atacatccaa tatgggacca tgtttttgtt acctcttggt acYatctctc
24781 ttacagttta tttggaaggc attagcccat gccattcca cagtattcta tttttaacac
24841 agcagccagg gaggtctttt aaaaatatat gttaggggaa atgggtcatat ggtacaaagt
24901 ctcatthtatg caggatgagt aagttcttga gatctaatat actgtatggt aactatagtt
24961 aacagtactg cattgtatat ttgaaatttg ccaagagagt agatcttaag tgttctcacc
25021 aaaaaattta aaaagtaact ataagagatg actggtaagt taattagctt ggcagtagtg
25081 aatatttcac agtgtatat aaaacatcat gttgtatggt ttatacaatt tttatttgcc
25141 aattgtacct caataaagct ggaaaacagt atgtcagggtc attactctgc tcaaaaccct
25201 gcaattgctt cccttttcac ttgtagtaaa agctttatct ttaggttaaa gggccataca
25261 tgatctggcc actactcttc ccacctgccc taactattct gacacctcat ctctactta
25321 tccccttctt tctcatacaa atccagtcac attggcctgt ctgctcttcc ttggggccaca
25381 ctaggcatac tcccatthca gagccatgta cttgctggcc cttctgtgtg ggatgctctt
25441 ccccagaaa tccacatggt ttgcttctt accttcttca agtatttctg ctaacagcac
25501 catctcagaa gtgagggtc tttgaccact ctcaccttct ggcaatttta tatcctcttt
25561 ccctgtatta ttttctctcc acagcaatta ttacctttta ctatactaca tgattaattt
25621 ctgtctgtct acactcacca gaatgttgac tgttatatcc catcccccta cccactgtct
25681 agcaaaaaca ctttgtgtct aaaagagAAC cttgcacaca gcagatgctc aatatgaact
25741 aaataaatga aagaatgaat aaatgtacca ggtaagaatt tagtaatgaa aaaaaataa
25801 ccaccctcac aaaatttctt gaattatact taggactcga cttccactc taattgaatt
25861 aatacaccaa tgtagaccac taagtaaagt cagagagaaa atactggcag atttaatgat
25921 gagaaatgca ttggagccta caagatagaa aaactctgga ttacttcacc atatgaggga
25981 gctgaattat tctgttagat acctaatthc tottaagttt tgagattaag ataagagaaa
26041 atcaagccta tcatttgagt aataatgcaa ttttgaaaag tacactgctc agaagtttaa
26101 aaatttctgg tacagtccca aactgaagac ccactttttt cttatctcct gttgcttcag
26161 cttactaagg cagagattac tctccatttc tacactatat ctgatgtatc taaattttgt
26221 ttatatgtac ctactttata tgcagtagga aaaagatttt ctaaaataag ataYattttg
26281 ttcaccaagc aaaattcaat tcagtaatga gaatgtcata cttttttcca catgagtttt
26341 gatcccagct cttctctccc tggctttctg ggccatttct ctaagtttct cttcatgttt
26401 ttccctttct ttctgagcca ttttctctc tacttgggca cgcatttcca cagcttcacg
26461 agcctgttgg taaagtcaca tgttaaacag gacactatca tgggataaat atttatggct
26521 atcatccaac tccctaacat ctggctggta agagcaatta tacagaattc agatttggtta
26581 ttgctaatta aaacaaagag tcttgtccac taaaagatat cctgcctgga agacactgca
26641 aggtcagctt ttttctctgg gaatatthta gtgattgaaa ctatcgtgac cccaattaat
26701 cttgtaagtc aagtatttca ctaatgcttt ctcagaaaca atctaaagaa caaaattaaa
26761 gccaggcata gtggctctct cctgcaatcc tagcactttg ggaggccagg gtggaaggac
26821 tgcttgagct caggagcttg ggaccagcct aggcaacata gtgagatcca tctcaaaaaa
26881 ataacatttt caaaattaat aacactttca aagttaatca agtcaactca agataaaatc
26941 ttaacttaca tctgctagat aatttttata agggactca ctgtgatata aaagacattt
27001 tttttatggt ccaaacacat gctatgatgc atgtgaactt caatatcaca tattaattcc
27061 ataatathta tatttacata tattttttga gatgaagtgt cttactctgc tgcccaggct
27121 gaagtgcagt ggtgcgttct tggctcactg caacctccac ctccctgggt cgagagattc
27181 tctgcctca gctcccaag tagctaggat tacagggtga tgccacatcc agctaattgt
27241 tgtattthta gtagagatgg agtttcacca cattgggtcag gctgggtctg aactctcaac
27301 ctcaaggaat ccaccagtct tggcctccca aaatgctggg attatacaca tgagccattg
27361 tgcccagcct aattccataa tatttaatac attatgtaac attaatagat ggccaatgct
27421 atgaacgcca ttttatgtaS tattcaattc attagaatgt ttatctgcct tttcctgcaa
27481 ctgccctttt gggggacatc tacatctaaa atagaggaaa atttgaaatc aaaaattatg
27541 aaacctagca atcttcaaaa aatgggatca tccataggaaa ccattattct gacatgttgt
27601 gagggagccg gatcaccact gtggggtgta tgtacacatc tacaaaagct gggagcatgc
27661 agagagctgc caactagcag ctgccatttc tgacacacgt accatgggtg agactctctt
27721 tgggtgctcg gtactatagt taaattatca gtaccttagg taaccaagaa tggattthta
27781 aagtaacaag agcattaaac aaattataac aaaccaacct tccgatcagc aatgtagagg
27841 gcttctgcca atttggcgaa atthtcatth atgtgtactg tctgtagtcc tcttccatca
27901 gcagccagac gtttgtctaa tggaaattgta taacctaga gtgaaagcag acagaaaacc
27961 cagtacaga agtgcctcaa ttaatcgtct gaagthaaat taattthatt ttttctgagc
28021 tggagtcttg ctctgtcacc ctggctggag ggcaggggtg ccatctcggc tcaactgcaac
28081 ctctgcctcc tgggttcaag cgagtctcct acctcagcct cccgagtagc tgggaccata
28141 ggcgtgcgcc acacactcgg ctagtthtthc tattthttagt agagacggag tttcaccatg
28201 ttggccagga tggthttgaa ttcctgacct tgagtgatec gcccttggcc tcccaaagtg
28261 ctgggattac aggcattgagc catcgagcct ggctaaaatt aaattthaat atgcccacat
28321 tttgagaacc acttaactgg aggttcttht tcttgcacat tttcttcaca atgatgcaaa
28381 acaacagcag ctatcaatga gtgctthtat tagaagatca agcacttaca cctatgggtct
28441 cattthaacct tcacgataac tctataaagc ttctaacatt attgtgtcca tttcactgat
28501 gctthtggtta catccccaag gtcatacagt tagtaagtgg gcgattagga tthaaactca
28561 Ncaggattthc agaaccacaag ctctggaaaa atagataatt gtgttaataa ttgtcgattt
28621 taataaaagg aaatcactgt caaacagttc aacagttgct cctcaagtaa atttaacagt
28681 caaacaagg tagaatcact ataactctag catctatagg aagthaaatc tgctgtactg
28741 tcttaatgat ctgttatatt cttagaatcc tgaagthtta gtaaatagaa aaaaaggct
28801 ggggtgcagta gctcaagcct gtaatcccaa cactthggga ggccaaggca ggtggattgc

```

```

28861 ttgagccag gagttcaaga ccagcctggc aacatgggtga aaccccgctct ctaccaaaaa
28921 tacaaaaaag tagccaggca tgggtggggca cacttgtggt cccaactact cgggaggctg
28981 aggtgggagg atcgctgag cctgggagggt tgaggctgca gtgagccatg atcataccac
29041 tgtactccag cctgggcaac agagcgagac cgtctcaaaa aaaaaaaaaa aaaaaaaaaa
29101 aaccaagaa aaaagaaaaa aaaatgtttg ctaaacaact gaatttctac attctaaaac
29161 tttgcatccc atttcaataa ctcaagaact gtacttgaat gtctatgtaa ctttcaggct
29221 tagctttatt ttccagatat ctgactagtc tctcaaatgt tgacttttag tccatggtct
29281 cataataaaa tgaagcatta tagaaccagc tcaagatacc atccagttac aaaataccaa
29341 tcaactcaaa tcagaccagt cggcaacctc tttgttttag gtgagtatat aaattctctt
29401 aagaaacctg aaatggtctt ctttatccat caaaaataaa atcatgaact atgattcagg
29461 gaagatgaaa cagtaactag caaatctatc ccacaatcta cagattctta acaactccta
29521 gaaacttttg caattattag agatataatag cttaagcctt cactactaca gagccagta
29581 gttgaatat attagcactta aagtatccaa gcatttactc tgttcttttg tcatataatc
29641 ttttacatca gtttactttc ttttagaaat aatttttaga tataaatttg agttttctaa
29701 ataccatctt gtatttatat gacactttat tctacttatt ctttctctat gtgcttctgc
29761 tagctacaat tcactaaaag aactgatatg gggccgggtg cgggtggctca cacctgcaat
29821 ctaagccctt tgggtggccg aggcggcggt atcacaagggt cgggagatca agaccaacct
29881 ggccaacagg gtgaaacccc gtttctacta aaatacgaaa aattagccgg acgtgggtggc
29941 atgcgcctgt agtcccagct actcaggagg ctgaggcagg gcaatcgctt caacctggga
30001 ggtggaggct gcagtgaagt gagatcatgc caccgtactc cagcctagtg acagagcgag
30061 actccgtctc Naaaaaaaaa aaggaaactga cacggtattc acgtgcctgg catactaaca
30121 tttctattac attaaaaaag tcaccaaat gggtattcct ttttgaaaat gctcagttaa
30181 accacgtgtt gtttcaacta cagttatgca ggctgtagtt gttttactgg tgttttccag
30241 taggttatac taatagagac tgatttgaca acttaattac ctttgcattt ttccagttag
30301 aaatacaagg aggaatcttc cactcttgtt gttcctttac agtcatctga gagaagaggg
30361 aaagaagaga caagtttaga tttatagtct acaaagtaaa tctaagtata atctttatct
30421 tcaaagacag ctccatatac actgacatat gcacagccgt agtaaaaggc cagcagttca
30481 tttgtttgct agcactagtt taccatataa ttctagtaat aactttgaac tagtgtgaaa
30541 aatggaaaat aatctagaaa ttattcttga cagttataaa tgttggctag tatttttcca
30601 tatttaaagt gatgtgactt ttttcttttt tttattgaga cggggtttcg cttttgttgc
30661 ccaggatgga gtgcaatggt gcaatcttgg ctccaccaca cctccgcctc ctgggttcaa
30721 gtgattctcc tgcctcagcc tcccaagtag ctgggattat aggcattgctc caccatgccc
30781 agctaatttt ttttaaagta aagacggggt ttctccatgt tggtcaggcc ggtcttgaac
30841 tcccgacttc aggtgatctg cccgcctcgg cctcccaaag tgctgggatt acaggcgtga
30901 gccaccacgc ccggccgatg tgacttcttt tggatgaaaa attgttcttt tgattaacaa
30961 aacatatctt aaaaagtcaa attaccaggg acctaataga cccatatatt cacttcttat
31021 aacatcctta aactgaaaca gcagaccctg tccattccat taaaagtagg gtttgcatta
31081 ctaataacaa aacttacagc taacatgtta tatacattct cataagcatt cttgaaactt
31141 catcttgaaa aataaaaaaa gaaactacaa gtcagtgtgg tgacatgcac ctgtataggg
31201 ataggagggt tatctataaa attaataacc atgagttaga aaaaatattt tggactacag
31261 caaagaatac ctttcggcta ggagaatgca tgacaggcgc aggaggagaa ggtgggtccc
31321 ggggaatttt cttattaatc ctgaagtata aaaacacaa cagagagtga tatagtttcc
31381 tcccttttag tcatcatatc aagtctctcc tcctttttct tgcataaaag tttcaaacat
31441 agacaaaaac agagactgta taatgatata catttaccac tccactttga caatgaataa
31501 aacatggcca actttgaaac tgttactcac cccacctcca caacattatt gtcattttgc
31561 agagtaatat acttttttcc actttaaaaa gcagcttttag gtcgggtgca gtggctcatg
31621 cctgtaatcc cagcactttg ggaggccaag gtgggcagat cgcctgacgt caggagatcg
31681 agaccatcct ggctaacatg gtgaaacct gtctctacta aaaatacaaa aacttagctg
31741 ggcattgtgg tacacgcctg taaWcccagc tactcaggag gctgagacaa gagaatcgct
31801 tgaacccagg aggcagagggt tgcagtgaac tgagatcatg ccactgcact ccagcctggg
31861 tgacagagcg agactgtctc tcaaaaaaca aaaacaaaaa caaaaacaaa aacaaaaaaa
31921 ggcagcttta ttgagataat tgacatttat tagctataca tatttaaagc atacgatttg
31981 attaaatttt gacacaaata tgcacctgtg aaatcatcat cacaagcaag atagtgaaca
32041 tgtctatcat cccaaaagt ttctgcttgc cccttgccca ttcctcttgt ccctccatc
32101 tcctctctgt ccctacctcc ttccccagag gcaaccacct atctactttc tgtaactata
32161 ggttagtttg catttctctg agtttttagat aaatggaaac atactgtatg tacttgtttt
32221 tgccctggct ctttctactc gcatattgtt ttgagattca tccatgttat tgtgtgtatt
32281 agtagcctat tcctttttcac ttacttgaac cttggaggct ccattggatc tttctgcatt
32341 tctaccatcc gaataacct ctgttttagct ccagagttga atgccactcc ttgctgagat
32401 ggtgtgtatc tgaagaaagc agataaaaac taaagggtga attagttcaa gctttcagta
32461 ggtatttttc ttctattaca atcttaagct agactacatt ttcaattcct ttgcgaaagt
32521 attaacagaa aattaacaaa atatttagac aaagcagaca gcaagaggga taaaagaaca
32581 taaattatga gttacagtca aaatataaac ttgagtggta ttagtttgca aataacccat
32641 cctcatatgt tttccaacat ggaagggtgc gtgttcagtt tcacagataa gcagtctaga
32701 aaatagtacc tatttagtat gcctgcactc gaggaaaaaa cactcataat aatcccagca
32761 ggcaacttac ggttagcagt ttttgattaa tcataggtta taaaacagag aaaagaataa
32821 tgacagcagc cctaccagct ctgaattttt cctcaatatc tgtatgtgat tcaattctct
32881 atgcagattt agtcaagtaa aacgcctcaa aatttagaag tattataaag atatctatta
32941 cttataaatg gaaaactata aataataatt gtgatttagg tcatatacca caagtaactg
33001 ttaattttYta aaaacaaaaa atataatttg aaaatagcat agggccaggc cgggtggctc
33061 atgcctgtaa tcccagcaca ttgggaggcc gaggtgggca gatcatctga ggtcaggagt

```



```

33121 ttgagaccag ccttggccaa cgtggtgaaa ccctgtctct actaaaaata caaaaattag
33181 ctgagcatgg tggtgcaagc ctgtaatccc agctactcag gaggttgagg caggagaatc
33241 gcttgaaccc aggaggcaga ggttgccagt agccaagatt gtgccactgc attccagcct
33301 ggggtgacaga gtgagactcc atctcaaaaa aaaaaaaaaa aaaagaaaat agcataggct
33361 gggcacagtg gctcacgcct ataatcccag cactttggga cctgaggagg atggatcatt
33421 tgagttcagg agttcgagac cagcctggcc aacatggtga aaccctgtct ctactaaaaa
33481 aaatacaaaa attagccagg tatggtggtg ggcacctgta atcccagcta ctcaggaggc
33541 tgaggcagaa gaatctcttg ggaggcagag gttacagtga gccaagatca caccactgca
33601 ctccagcctg ggcaacagag caagattctg tccccacccc caaaaaaaag cataaaaaga
33661 ggccaagtct ggtggctcaa gtctgtaatc tcagcacttt gggatgacaa ggcaggagga
33721 ctgcttgagc ccaggagttc gaaaacagcc tgagcatcac agcgagaccc tgtctctaca
33781 aaaaattaaa atattagcca ggcatggtgg catcaaggca ggaggatcac ctgagcccag
33841 gaggtggggg ctgcagttag ctgtgttggg gtcaccgtac tccagcctgg gcaacacaga
33901 aactttatct cagaaaacaa acaaaaacca aagtggacac cttaaaaaat tctgctttca
33961 attgtctgca aagacagtag acaggctttg agtcattatt gaaaacaatg catttataat
34021 ggttgctaag tgggttagtg aaagaatacc atgaccccc aagctgaatc aagttcagaa
34081 tgaaactaag tcttctaggc atgattcata ccggatatac tgagcaggag ccaatttgtc
34141 agctgctcga actggcatgg ctgcggcgac cttctgtgat acagattttt ctaaggctac
34201 tcttgtcttt tctgttatct gaaataggaa atatcacatt gagagtttgg aagttaatca
34261 ggatgtaaat agtcacgaa tatatcaatt ccagttacc tctttaatag cttcttcac
34321 gggcctttgc aggtctggat catctgcatt cataacctcc tttggaacca ggtcagtgtg
34381 tttgctataa atgacctaaa atgttcaaac acaagcaggc ttaagaaaag caaacaacga
34441 aaagaaacct cattagccat ttcagatgtc aacatgccct ctcagcacac ttaaaaattt
34501 aggacactca gatthtctct tttagatttt aaaaccaagg aagcttaaaa tatataaaca
34561 aattgctacc ctggctgtaa gttagtaatt ttcccttgac ctcattgcatt taaattgttt
34621 gagatcttct aatcaagtta gtatccaaat aaacctatgcc aacaaaatca tgcattgatg
34681 atcactatth ttgaggccca ctaaaacttg aaattaatga taatacaaat tgcctatagc
34741 accattaacc tggattacaa actcatcaga atttaagtca ggttaccaaa taatttccaa
34801 attcactggg cctgaaaaat tttattgacc tcatcctatt tataacgctt ctcttttctg
34861 ccatcaactc tattcacaga ctaagaaaat aaacatgtgc cacagttaaa aaaccagaa
34921 tgctttcttc catgagaaga caaaagaaaa aaaaaaagaa aaagaaaaat atattctata
34981 tatacaactt attttatatc cattatccaa attgaggcct gttatatgac ttctactatg
35041 cccaacatgg tttctattag gctgacactg atgtggtagg ctcttaacaa atagaatact
35101 ggttactttc aggtccatct atacttctta aatatthtca taacaattta catggcatat
35161 tttaaagtaa aaaagagata cagaggggccc gggcgcggtg gctcacgcct gtaatcccag
35221 cactttggga ggctgaggtg gctggatcat gtggtcagga gatcgaaacc atactagcta
35281 acatggtgaa acccgcgtct tactaaaaaW acaaaaaatt agccagttgt ggtggcaggc
35341 gcctgtagtc ccagctactc gggaggctga ggcaggagaa tggctttaac ccgggaggaa
35401 gagcttgagc taagccaaga ttgcgtcact gcactccagc ctgggtgaca gagcaagacM
35461 ctgtatatth aaaaaaaaaa aaaaaaaaaa aagagagaga tacagaaaat tcaataaata
35521 ataggcatth tacctttaat gcttttagtca gaaattcttt gaggtacata aaaagaaagg
35581 acaacttata aatatcaaag aaaatcaaat tcctaggcac ttgagatctc cagaattttt
35641 ttttgtagaa ctgtttacca ctacaagcca aagtcttata ttaataagtc tatcatacat
35701 cattcattaa aaaagtttaa aggaaatgca tgctatthtct aattttctac tccaaacaga
35761 gcaaaaaagt gtgagccact ttatggctta tgcaacttga cctgactttg cctatgcctt
35821 caatctcccc ttacaactct cactctctca ctcattatgc ttcagtcaca ctagctcatc
35881 ttctgtttct tgaacataac atactthtcc ccaattctag gcctttacag agttctgttt
35941 atcattcttc aagtaagctc tcaatctgtg tgtctcagat caaaggctct ccattatcga
36001 ggcttcttct gatcgctta gtagtaaccc ctccccaccc aatcatttgc tccatagcac
36061 tgtttactgt gatcaagact gttcacagca tgaaattatc tactttacat ggttattatc
36121 tgtctcccgt attaaaacaa taaaaacggg gagggcacgg tggctcacgc ctgtaatccc
36181 agcacttttg gaggccgagg tgggtggtat acctgagggtc aggatttcaa gaccagcctg
36241 accaacatgg tgaaaccccg tctctcccaa aacagaaaaa attaacagg catggtggtg
36301 ggtgcctgta atctcagcta catgagacgc tgaggcagga gaatcgcttg aaccaggag
36361 acggagggtg cagttagccg agatcatgcc attgcactcc agcctgagca acaagagtga
36421 aactgtctcc aaaaaaaaaa aaaaaaaaaa aagtgtctcc tgtgctttat aataatgact
36481 ggagatattt gatcaatatt ttttgtacaa atgaataaat aaatgaattt tagagatatt
36541 ctgttacatg ctaaagggtg ttataggcca tgaacagtga ctcacgcctg taatcacagc
36601 attttggaag gccaaagggtg gaggatagct tgagcccagg aattcgagac cagccagggc
36661 aacatggcaa gacctatctc tatttttaag aatggatgga tgaatgaata aataaataag
36721 tttataattt aggccgtaca gaactttcta taagctactg atttcccaga aaaaactatc
36781 tcatggctat acactaaaat ctccagcttg tttttctcag gagtgagaag agggatcagg
36841 taagaaagcc taagatgatt tagcacaaaa cacgtactac tgatatgtga gttattagt
36901 tcaccatact ctaagagtgt tgatttttga agggaccata aagctcactc tactgaaaag
36961 agtgagggtc agtacattaa gatcatacag ctactatctg acctcaaaag tcttatttcc
37021 tctcagcatg gaaaaaccta tacaacccta agctgaaaat tatataacaa cacaagaaaa
37081 aaataccaat tctatgaaga gttaatcatg aRgagtttat cacttctcca tagcaacggt
37141 tataaggaaa ggattctaag taaatggctc cctggtagtc atgtatgttc aacataaagt
37201 gtcaatacta atttagcata caagagtcac ttgctgctcc ttatttgggc attccaaagt
37261 taataaccct tcaaatgagc atcaRtaaga ttctagtatc tcacaaggct gagtgaagga
37321 catctgaaga gcaagattcc tccatagtaa ttaattataa aaccccccat tttttttttt

```



```

37381   ttgagacgaa gtcttgctct tgttgcccaa gctggagtgc aatggcgtga tctcagctca
37441   tagcaacctc cgcctcccgg gttaaaacca ttctcctgcc tcagcctccc tcccaagttg
37501   ctgggattac aggcgcacga caccacgtcc agctaatttt tgtattttta ttagagatgg
37561   ggtttcacca tgttgccag gctgggtctcg atctcctgac ctcaggcgat ccacccgcct
37621   cggcctccca aagtgtctggg attacaggcg tgagccacag cacctggcca aaaccccaaa
37681   tttttatagt ctgagaatta aatgtgctga ggaaactgag taccaggagg caaatgggct
37741   ggggagYgtt ttctgaaaaa tacaatatat tcttgaaagt atcagaagca caaataagct
37801   ttgtcaacaa gataaagtag taactcatct gtgaaacaga tattttatta cagaaaactg
37861   gcaaagaact agactgacta aaaggataag cctgtcaaaa cattcactat gtgaggtaga
37921   aagaaaacgc taatctagct tagctagtgt gtgaaatcat acaaacaaga taacatataa
37981   tttatcatgg ggtcagttta aagttgttac ggttttttag gggtaatacg ttgaaggcat
38041   tcttttgggt atagtaYgtg tgtaacattt cgtttcttta agagataggg tttcattata
38101   ttgccagggc tagtctcaaa ctctggcct caaatgatcc tcccacctca accttcccaa
38161   agtgctggga ttacaggcat gagccaatgc acttggcctg tatgtagtat ttcttacata
38221   actatttcag agggaaaaat acatacacca agccctttat ttcaagattt atcacttggc
38281   tgggtgtggg ggctcatgcc tgtaatccca gcactttagg aggccgagggt gggtaggata
38341   cctgaggttg ggagtggag actagcctga ccaacacgga gaaacactgt ctctacaaaa
38401   aatacaaaat tagtcaggcg tggtaggaca tgcctgtaat ccagctact caggaggctg
38461   aggcaggaga atcacttgaa cccgggaggc agaggttgcg gtgagctgag atcgtgccat
38521   tgcaccccag cctgggcaac aagagcaaaa ctccgtttca aaaaaaaaaa aagatttata
38581   actttcataa ttaggaaaaa aaaagcattt ggttgatatca agatttacac taaaaaaac
38641   tttttcatcc ccaattttgt atgactaata agtcgtatac acagtactta cttcacatgt
38701   agagaattgc cttagacttg tcctagaata ttacgtctta gaatcctcac tgattcttct
38761   cacctcttat acctaacacc tagtattttc cattcttact cattcactat taatatattca
38821   gtgagaactc cctcgtttct gaagaatacc agacctctMR gaagcaaatac agaaatctta
38881   gtccaaattc ataaatccaa taacctgttc agtctctgga ataacaattt ttttaaattc
38941   tattttatat attatgcagt ccatttctat ttcttctaaa acaggaaaaat cagtgattgt
39001   caaacagggc atcactgcca cctctaactc ctctctccca gtgcctttgt aaatgtgtga
39061   ggtgtttcta gttaagacaa tgggggtagg atggggacgc tactgggatt tataggtagt
39121   gccacttatg ctaaacattg tacaatgctg aagatgggcc taaacaatca aagtgtctcc
39181   ccagtgccaa tggcacataa tagttacttg attaatgttg aattactcaa tgcattccaa
39241   acttcatgca tgaatctatc cacttctaga aaacaaacaa acaaaaagat ataaacctga
39301   gagtgggtccc agtttgggggt ttgtttctag tggctgcatt acagacaaaa gcaacgatct
39361   ggccgggtgt agtcgctcat gcctgtaatc ccatcacttt gggaggttgc agtgagccaa
39421   gatcgtgcca ctgcatttca gcctgggtga cagagtgaga ctccatctca aaaaaaaaaa
39481   aaaagaaaaa aagaaaatag cataggctgg gcacagcgac tcacRcctat aatcccagca
39541   ctttgggaag ctgaggagga tggatcattt gaggtcagga gtttaagacc agcctggcca
39601   acatgggtgaa accctgtttc tactaaaaat acaaaaaaat tagctgggca tggtaggtgtg
39661   cgctgtaat cccagctacg tgggatgggt aggcagaaga atcacttaaa cctgggaggc
39721   agaggttgca gtgagccaag attgcactcc agcctgggca acagagcaag tctccatctc
39781   aaaaaaaaaa aaaaaaaaaa gaaaagtaaa gaaaagaaaa gaaaaaaag agaaaaaca
39841   aggaacaatg ctttggagac cttatttggc caagatacta aactccaaaa atagatagtt
39901   cagtctgaac agttctactc tattttgaat acaaaataat caccaatata gacagtgatt
39961   taaacatcat tccctagaaa tcagataaaa ctctgcttt ccagtcttga aatataatgc
40021   aaaacggacc aaagctgtat ttcattcaaa ataacacaac ctgccaatgc caaattgttg
40081   cccttagatg ttgttttttc ctaccaaattg ggactggaga ggtagcacat accaataaag
40141   aagagtgatt acccccaagg agaaatgcac caaaacaaag gcaactgaag tcaagtgaag
40201   gcctccatgg tatagRgtaa atttccagta tatgttctcc atgtataggg gcctaatttt
40261   ctttttgcag gagtggacta Yacttctca ctggcttcag aagtggtttt gtgttataca
40321   atggaaacca ctattatttg ctgaacaaac actgggtggac gccttatgtg tcaaactttc
40381   aggcagtaag taaggcacca aagacggaaa tataaatata taatccctgc ccttaaaaaa
40441   attatagtca aatgatacag attatgagtg aacagataat tacaacaaaa ggtgaagact
40501   gctatgataa acattgagag tagagaagag ggacactcag tctagccagg gaaggtccag
40561   gacaacaccc tggaaatagt aagagtgagc tgagaatgga aagcaataga attaagtcag
40621   agaatgaata agggtagaac tttctaggaa aaagaatatc catgggaagt ctcaagagag
40681   aatgtgtcat attatgggaa ctacaagtag ttcctcatgg caaatattta tagggaatgc
40741   ttgaatgttt tttcttcttg gctgggcacg gtgtctcatg cctgtaatcc cagcactttg
40801   ggaggccaag gcagggtggac tgcttgaggt caggagttca agaccagcct aaccaacaag
40861   gtgaaaccca tctctactaa aaagacaaaa acgagctggg catggtggcg ggcgcctgta
40921   atcccagcta ctcagaaggc tgaggcagga gaactgcttg aactgggaag gctgaggtcg
40981   cagttagctg agattgcctt actgcactcc agcctggggg acaaagcaag atttggctc
41041   agaaaaaaag tttttttctt cttaacaacc acctgggcta ggtgcagtgg cacacaactg
41101   taattccaac actctgggag gccaaagcag gcagatcact tgagctcagg agtttgagac
41161   cagcctgggc aacaagggtg aacctgttca ctacaaaaaa taaaaaaatt agccgggcat
41221   ggtggtgtgc acctgtagtc ccaactcctt agaaagctgg ggtgaaagga tcaactgagc
41281   tcaggagtcc aaggctgcag cgagtcgtta ttgtgccact gcactccagc ctgggtgaca
41341   gagcaagact gtctcgaaaa caaacaacaa cacatataat agtatattat ttatagtga
41401   aacaaacaga atggctaaaa ctgaactatt tatttttggg tttcagtatt ccSatcagga
41461   gagttgaagc tagccaagaa aagtgagtaa ggggtcaagc atgccaatag agcttagtcc
41521   ttaccctaaa gaccatggaa gccatagaaa gattttaatt gtgcacactt gcgtgtatgt
41581   gtatatatat gatgagaaag acaaacagac atggatgaat ttgtttgttc atgccagcaa

```

```

41641 gacaaatgtc aatgagatgg ttgcaggcct ggctgcagta aatcaagcaa gaaatgaaaa
41701 cagcctgaac taagtagcag agaggggaat atacttgaga agtggttaagg aaataagatc
41761 gttcacagag aataaataga tggagggtct gagggaaaca agaactagaa taattgctga
41821 gcagagagaa catatgggca gtatgtgtca catgtgaaat ctaaatagcc tttgagccag
41881 taagtccaca cctaagaatt taaacaaata atcatgttca acaagatgtt tgtatgtgga
41941 tcttgaatac atttgtttgt aaaactaaaa accaccaatg cttaaaaaaa ctagcagata
42001 accatgccac ggaatcctat atagattaat aaaaaaaaaat gaagtagact tatatgtact
42061 aacaaaaatt gtcaaattgt ttaagtaaaa Waaaaagcaa gtcaaaggaa gttatgggca
42121 tcaaaattcc attcatgtaa acaacagttt ctaagtttgt atgtatacat aaaatgagga
42181 tatacataaa tatctaaatc cataataaaa atttggaatt atagctcccc ctccccctcc
42241 ccccttctgt gcacgggtct cctctccctc tccctctcca cggctctccct ctgatgctga
42301 gccgaggctg gactgtgctg ccaccatctc ggctcactgc aacctccctg cctgattctc
42361 ctgcctcagc ctgcogagtg cctgggattg cagggtgcgc cgcacacgcc tgactgggtt
42421 tcgtattttt ttgggtggaga tgggggtttt ctgtgttggt cgggctgggt tccagctcct
42481 aaccgtgagt gatctgccag cctcggcctc ccRagggtgc gggattgcag acggagtctc
42541 actcactcag tgctcaatgt tgcccaggct ggagtgcagt ggcgtgatct cggctcgcta
42601 caacctccac ctcccagccg cctgccttgg cctcccaaag tgccgagact gcagcctctg
42661 cccggccgcc accctgtctg ggaagtgagg agcgtctctg ccaggccgcc catcgtctgg
42721 gatgtgagga gcccctctgc ccggccgccc agtctgggaa gtgaggagca cctcttcccg
42781 gccgccatcc cgtctaggaa gtgaggagcg tctctgcccc gccgcccata gtctgagatg
42841 tgggtgagcgc ctctgccccg ccgcccggtc tgggatgtga ggagcacctc tgcccagccg
42901 ggaccctgtc tgggaggtga ggagcgtctc tgccYggcca cccgtctga gaagggaaga
42961 gcccctccgc ccggcagccg tcccRtctgg gaagtgagga gcRactccgc ccggcagccg
43021 ccccgctccg gagggaggtg cggggcagcc cccgccccgg cagccgcccc gtctgggagg
43081 gaggtggggg ccagcccctg cctggccagc cgccctgtcc gggaggtggg gggcgccctc
43141 gcctggccgc cgccccatcc gggaggtggg gggcgccctc gccggccgcc cccgtctggg
43201 aggtgaggag cccctctgcc cagaggccac cccgtctggg aggtgtacct aacagctcat
43261 tgagaacagg ccatgatgac Ratggcggtt ttgtcgaatg gagagggggg aaatgtgggg
43321 aaaagataga taaatcagat tggtgctgtg tctgtgtaga gggaagtaga cgtaggagac
43381 tccattttgt tctgtactaa gaaaaattct tctgcctttg gatgctgtta atcataacct
43441 taccctaacc cccatgctct ctgaaacatg tgctgtgtcc actcagggtt aaatggatta
43501 agggcggtgc aagatgtgct ttgttaaaca gatgcttgaa ggcagcatgc ttgttaagag
43561 tcatcaccac tccctaactc caagtaccca gggacacaaa cactgcggaa ggccgcaggg
43621 tcctctgcct agggaaaacca gagacccttg ttactttgtt tatctgctga ccttccctcc
43681 actattgtcc tatgaccctg ccaaatcccc ctctcYgaga aacacccaag aatgatcaat
43741 aaatactaaa ataaataaat aaataataaa aatatatttag gaaaaaaaaa tttggaatta
43801 tatatatcac tgtagtaaca gcagttacct ctgggaagta aagtaggaga aaagcgggca
43861 ggactRtata tacttgtgat atatacttat ggtatctttt actataatat attatttgta
43921 taactttttt ttttatattga gacagagtct tgctctgtcg cccaggctgg agtgcgggtg
43981 tgccgtcttt agctcactgc aagctctgcc tcccaggttc acgccattct cctgcctcag
44041 cctcccagat agctgggact acaggtacct gccaccatgc ccagctaatt ttttgtgttt
44101 ttagtagaga cggggtttca ctgtgttagc caggatgttc tcaatctcct gacctcgtga
44161 tccaccacc tcagtctccc aaagtgtctg gattacaggt gtgagccacc acaccagcc
44221 tatttgtata attKttttta aaaaaatcaa tataatagta agaaaaaatg actcccaggc
44281 tttcagcata aacaattagg aaaatatcac taccacttac tgagttacag aaatagcagg
44341 tagattaagt ggaaaattat gtatttaggt ttggatttga ttaagtagca ctttagggaa
44401 atctagatac acttgccctt gtagacagta agatataagg acctacagcc cagcagagaa
44461 tactgggctg gaaacacaga ttgaacagtc atcagcatat gagtggaaca taaattacat
44521 tagttaaaga gaatgtgctg tgtttttttg ttaaagtcac agaattatta aaagaaaaaa
44581 atatataaag agaatRtgct gtaaaaaaat gtgttaagag acttttgcca gagagcacct
44641 catcaaactg gtttaggtga ggtcattttg tagtgaattg aagagtgaag ggaaagtga
44701 gaaacagggc aaaaacaact cctgaaacaa gcctgaaaaa agtgaagaaa attaggtggt
44761 agctagacag aacactgcga gtaggtactc agggaaaagc ctatctttca aaagataaga
44821 aaggccaggg agcctcatgc ctgtaatccc agcactttgg gaggccgagg Ygggcagatc
44881 acgaggtcag gagatcaaga ccacctctgg taacatgggt gagggccgag aaacccatc tctactaaaa
44941 atacaaaaaa attcaccggg catggtggca ggcgcctgta gtcccagcta ctgggggggc
45001 tgacRtacga tgatcgctc agcccaagag ttcaagggtg caatgaatta tgagggtgcc
45061 agggcactac aatctaaaaa agaataaaca aacaaatgac aagaaaaaca agcacattca
45121 aatgctaaca ggaaagagcc gttagaagag gagggatgaa gaactgttga gaagattaac
45181 tagtaggtaa ggttcataga ggaagaggga agggattggg atccagaata catatggcaa
45241 gatcaggtgt agatccaggt gcagtggctc acgcctgtga tMccagcact ttgggtggca
45301 gaagcaggag gattgcttga gcccaaaagt tcaagaccag cttgagtaac atagggatat
45361 cccacctcta caaaaaata ataaatttag caggcatggt ggtgcacacc tgtgctctca
45421 gccactcgag aggtcgaggt gggaggaatg cttgagccca ggaggtcgag gcttcagtga
45481 gccatcatcg tgccactgca ctccagcctg ggcaacagaa caagaccctg tctcaaaaaa
45541 acaataaaaa aataaaataa aaaaagatta ggcttagaca gaagaaggca tttcgtgcaa
45601 aaacaaaagt aaaagtgcag gaaaaaggac aagtgcagga tgaagaaaat tgacaattgt
45661 ctccaatag tctttatatt caaatagatg ggggagtcac ctgctaagga tgagatggga
45721 tgaaaggagt aggaattaaa gtttggtggg agtaccaagg gagctgagct gaaataggag
45781 atataaatct gcatgattgc ataattgtct tccccaaag ctcagcagcc atgatgcaga
45841 agcaaaggat ggggtgttag tgctatttta gagggtaaat tgaaaaagtt tggcggggag

```



```

45901 agagaggcca atgataggca ctgaaagctc tcaagtattt ttccaaacat catcagttct
45961 aaggaaatct ttcacttcta tcttgagtat ttattttacaa gaaaaaaaaa aaactaggtc
46021 ttcttaaaaa tagttccttg gccctgagtg tagctgttct gtgatgagat tattttaagc
46081 aaattttatt tttggcctat ggattacttc gtagcagggc catcctaaat ctggatagca
46141 aatgctagtt ttgtacttaa tctagggcaa aagaagtttg tgtaatttat tataactcaa
46201 taaactatta aatacttgta atagagtaca tgtaagtact ctaagtacat ggaggaaatg
46261 agtcaagact ataggaaaaa actagaagaa actacaggat aaattaaaag ttgatggtaa
46321 ggctctgggg ttgcagattt ttaaaaattt actggcagtt ttagaatgct agtaatataa
46381 agtaactgtt ttaaaatgta cttttttccc cctttaaaac aaggtattgc caccgaagca
46441 agagtgcagt ggctcactgt atcctcaaac tcttgggctc agtcaaacct cctacctctg
46501 cctcccaagt agctgggaat ataggtacga gccaccatgc ccagccactg ctacttttaa
46561 cataattcaa acagcaagag atttatcgtg tccacaaaat ttaaaatggt tcctaaaata
46621 tttatcattc agggaaaaa tgagaggatt accttgtctt ttgactgtcc ttgtcgagca
46681 attgcatcat atttaatttt tccttcagaa tccacctgaa tggccagcgc attcgacatt
46741 tttttctttc gtcccatatc cagtggatac tgggccacat ggatctcttg aaaagcacct
46801 ccatctccaa aatcctacac attagaagta gttaaataaa atagttaatc atcatttgac
46861 attcaagata tattcattca ttcaacaagt aattgttgag tccttagtat gctagatgct
46921 agagatacag cagagttccc tgcctcttgt ggagtttaca ttctagtagg caaagatata
46981 aaaaacacat tctttggctt gtgataagta ccatgaaggt aatataaaaag aaaaagactg
47041 ggaaaagggg ctacttttga taggggtggt ggggacagcc tttgtgaaga agtaacatgt
47101 gagctaaagc ctgaatgatt agaaagcagt catgggaaga cacacacaca cacacacaca
47161 cacacacaca cacacacMcc acacacacac acacacaaag cattttctag atggatcaaa
47221 tagccaatgc aaaggccctg ctgcaagaat gagcttggtg tatttttagg aatgagaatt
47281 cagtggggct aacagcttaa taaggacagc agagcttgag gcacaagtta catgagtaaa
47341 aaacaccaga tcacaaaggg acttacatgc tacagcaaga aaatgtggat ttcatatatg
47401 caggacgaaa ctaagtaaaa tggctaggac aaggcaaaat atatgtgtat atatttttagc
47461 atataaatac atatttttagt gaggaacagg taaagctata cttggggcag aaatataaaa
47521 gattttttct tggaatcaga ttttattaac atattattta ttcattgtta tgtgagaagc
47581 aatgaatac aataggaagg atccagaaat gagtttacta catttctact agtgattata
47641 cataattatt taggagagag aactgagact gctaaagtag aacaagctaa ataaagtttg
47701 ctgatgaaat gtagtatttt aaaaaggttt atcaataaaa catgaggatc aagtataatt
47761 tttaagtagt taaaaaaaat tcagtagtat ttgcttagta cactttaaac atgatKcaca
47821 catgtattat ctcatttaat ccttgtaact ctttaacatc attttaaatg gaaacattca
47881 ggcttaRaaa aattaagcgg tgttcctgag atctcatagg tattatatgc agcacctgaa
47941 cccagatctt ttgagactcc gaaaagcttt gtatttttcta ctactatgaa atacctttct
48001 tttagctcaa aacagccaaa tgagtactat taagaaataa tagaaaacac aaattaaaat
48061 taatcattta gaggggggtt gatggaaaaa aaagaaaata ttcactttta caagacctct
48121 ttaagtaata ctYRttaga tctaagatat atgagttcct aagtacaata tgcttatttg
48181 ctaaagagat gtttgaagtt tttgaaaacc aagagaataa agctgagaga cattttcttg
48241 taaatgagaa agagttaaag cattcctaag ataagKgctt cccgtacca agccatcaat
48301 ctgacacatg cttggatttg ctagagtttt tcaactataa taagtacttc agaactgtag
48361 ctgtagcatt atgtggtcat taagcttgcc agaaaatcaY agcttttatt ttgaaaacta
48421 gaacaaaatg ccttcttcca cagaacattc actcccctca agcagcatcc atagcatttc
48481 cagattagct agccatttca acttgatttt caaataagtt gttctgtttc accaggatat
48541 atgaaaccac tgatagccaa gtaagaatct aaaaatctaa tagcaaccaa gtatcgtaat
48601 gctgaaatgc atggatgaga tttacattct atgtaagatg atgcctgtca cctcattgt
48661 gcaatgtact gacagaccaa acaatattta taatgcctca acagagacac tcaactgtct
48721 tattagatga tgccaatcac tacttttttg ccccaggtaa gactccttga taatctttca
48781 tcttcctctg cctcccaYaa atWacactat cagagagaac aaaagcaaca aaaatccctt
48841 aataattgca atatgactgg ccttcacaca ccagcattca taaggaccag aggaaagctg
48901 acaaaaaagc acaaaaaaga cctacatgtg ggttttttgg aatacatagg acaagatatg
48961 atctagttgg gtgttcctct tataaactct aataaagagt gtggggcagg cgcggtggct
49021 cacacctgta atcccagcac tttaggaggc cgaggcaggt ggatcacctg aagtcaggag
49081 ttcaagacca gcctagcaaa catggtgaaa ccctgtctgt actaaaata caaaaaatta
49141 gctggRtgtg gtggcacgtg cctgtaatcc tggctacttg ggaggctgag gcaggagaat
49201 cgcttgaacc caggaggcga aggctgcagt gagccaagat cgcaccactg cactccagcc
49261 tgggaaacgg agcgagattc catcccaaaa ataaaaaaa taaaaattaa ttaattaatg
49321 taaaggatcc tgagtaatta gaataggtgc tgccaaggaa gcttgttctt tttattttta
49381 ttttttattt tttttgagat ggagttttgc tgttgttgcc caggctggag tgcaatgggtg
49441 cgatcttggc tcaccacaac ctctgcctcc caggttcaag caattctccc gcctcagcct
49501 ccggagtagc tgggattaca ggcatgcgcc accacacctg gctaattttg tatttttagt
49561 agagacaggg ttgctccatg ttggtcaggc tggctctgaa ctctggcct caggtgatct
49621 gcccgccctg gcctcccaaa gtgctgggat tacagggtgt gaaagagcta agccactgcg cccgaccgga
49681 agcttggtat ttggcaacaa gctagagata gaaagagcta tccagatgg ttccttctcc
49741 ctcatgtcct tcaaatcaac caaattttgt cttatacccg caaaaatata ttaaatctat
49801 atatcagata tatattaaca ttctcaaatt aaaggtaaga aaacaggtga agagaaagaa
49861 atcagcaaag gaagtgttac tggagttttc cctgaaggaa agttgtctct tcagggttat
49921 gtggtattat cggaggggag gaggaggagg aggagcccaa atatgaaaWc cactttcatc
49981 tctcttatct tttactttcc cattattttc cgtaattcct gaatttataa aatattagtt
50041 ttcttgtaaa tatttaatat tttgatatag gaatagacaa atggtacagt tctctagtga
50101 ccacaaagca gtgatagata ataagcaaaa agaaaatgat acatcttctg agggaaatat

```


50161	acatcttgag	agcacataac	cagaatttct	atcacactga	cattcataat	cagaggttct
50221	aacattttaa	tttatgttat	agtgtgctat	aataaatttc	agcacaattt	aacaaatcta
50281	aacttaagat	ctatatgtac	ctctaataac	cgaggatatcc	agcctttccg	gtatccgtac
50341	gggggaggtt	ctcttcggga	ggagaccagt	gaggtctgcc	gtgatctctg	ggatcttgcc
50401	ttttcttcag	cctcaagctg	gtcctgagat	agctgagtag	gtgcaggtaa	aaagctataa
50461	gcaaagataa	taaaagtcag	aaatttaaaa	aactcttatg	tttaatttga	ccactgcaac
50521	ttggccacag	agacaatttt	tcctaogatg	cttttacttt	tcagaaaaag	agcagatttt
50581	tcaatgattt	atggtagtac	tcaatactag	ccattttata	atatgtggaa	gacagaagta
50641	ctcaaagata	cacagtaaaa	acatctgact	aggacaacag	caaatagatg	ccagaataaa
50701	aaattaacag	atatttcaca	taacagacaa	actcttaagc	gtttatgctt	ccatatttcc
50761	tttttttttt	gagaaagagt	ctcactctgt	tgcccaggct	ggagtacagt	gggtgtcatct
50821	ccactcactg	caacctctgc	ctcctgggtt	caagtgattt	tcctccctca	gcctcccaag
50881	tagctgggat	tacaagcatg	cgccaccaca	ccaggctaat	ttttgcaatt	ttagtagaga
50941	tggggtttca	ccatgttggc	caggctggtc	ttgaacttga	cctcaagtga	tcgctgacc
51001	ttggcctccc	aaagtgtctg	aattacagac	gtgtgccacc	acacctggcc	atgcttccRt
51061	attYccatat	ttctttcctt	tttttttttt	gagacagagt	ctctctgtgt	cacctaggct
51121	agagtgcagt	ggcaccatct	cagctcactg	cagcctccac	ctcctgggtt	caagtgattt
51181	tcctgcctca	ccctcccaag	tagctgggat	tacagatgtg	cagcaccacg	cccacctaata
51241	ttttgtattt	ttagtagaga	cagggtttcg	ccatgttggc	caggctggtc	tcgaactccc
51301	gaccgcaggt	gatgtgcccg	ccccggcctc	ccaaagtgtc	aggattacag	gtgtgaacca
51361	ccacgcccag	cctgtttcca	tatttcttat	aacaaacaag	taaacattcc	taataactca
51421	gggataaact	gtccagata	tacttgctat	tcttatactc	cttttttttt	ttgagacaga
51481	gtctcgttct	gtcgcaccagc	cttgagtga	gtgggtgcaac	ctcggctcac	tgaaacctct
51541	gtcgcctgga	ttcgtgtgat	tctcatgcct	cagcctcccg	agtagctggg	attacagggtg
51601	catgccacca	catccctatt	ttttgtattt	ttagtagaga	ctgggtttttg	ccatgttggc
51661	ccatgttggg	caggctggtc	tcgaactcct	gacctcaagt	gatccatcag	cctccatctc
51721	ccaaagtact	gggattactg	gcatgagcca	ccacgcctgg	ctactccttg	tttttaacat
51781	ttttaccatt	atgctcctta	ctttaaacta	cttcagtgtg	aatacaaaaag	aactaggatt
51841	aaaactgaat	gtaaaaaaga	ggtggataaa	ataaacacaa	gttgcatatt	taagtgtcaa
51901	gggtatctac	aatgaaattt	aaaacttaga	ggccaggcca	gccatgggtg	ctcacacctg
51961	taatcccagc	actttgggag	gccgagggtg	gtggatcact	tgagggtcagg	agatcaagac
52021	cggcctgatc	aacatggtga	aaccctgtct	ctactaaaaa	tacaaaatta	gccaggcgtg
52081	ctgggtgtgcg	cctgtaatcc	cactcgggag	gctgaggcag	gagaatcact	tgaatccggt
52141	aggtggaggg	tacagtgagc	caagattgca	ccattgcact	ccagcctagg	caacaacagc
52201	aaaactccat	ctcaaacaaa	caaacaacaa	caaaaaaacc	cttagaggcc	aaagaatcaa
52261	agcagaagcc	ctgaagatgc	agcttattct	ttagtcaagg	taacctttct	actaaatggg
52321	tcttaacaac	ttttaagtat	taaagtatta	cagtataact	ccaaagtatt	acaaaaggat
52381	cctgatggat	gaatatggag	aaaataacct	tagttccttt	gtgattcttg	gatagtaagc
52441	atacctaagt	agcagagctt	attaattatt	caaaaatatt	tattatttgg	gtacaagcac
52501	tatgctaggg	atgagactat	aaatggagaa	agacagctta	gtcttgacga	cagagaccaa
52561	aaaaaaaaaa	atcacacaaa	tctataatta	cacattatgt	taagttatga	tggaaaaata
52621	tagatgctat	gacagtctac	atgagaggga	tctaattccag	tctggggagg	taagtgtatg
52681	ctaggctcag	aattcagatc	cgacctatgc	cacttactaa	cctgggataag	ctacttacct
52741	ctctgaatct	gttttctcat	ctgtaataat	agttcataag	agtatctact	tcataagggt
52801	cttataagta	ttaaatgaga	gaaatccatg	aaccagttgg	tatagtatct	agacactttc
52861	aatacagggt	ctgtatgttt	gattatttca	gggctgttcc	atgactcctc	cagtttgggt
52921	taactgcctg	tctctatgct	ccccaaaaac	gctctacata	ccactactac	aacattacct
52981	tactgtattg	caatcatcta	ctcatttaac	tattctgttt	tcagtgaact	gtgagcagct
53041	ctgcaggaat	cacgccttat	gcttctttca	tcctaatgct	tccaagactt	ctagctcaca
53101	gctcgagctc	cttaaatgtt	gtaggagaaa	taaatacact	cttccccagc	actcaccatc
53161	tttatctcac	tacagccttc	ttatcttttc	ttaaacaagc	catctcagga	tctttacatt
53221	ggctattcct	tctgccatca	aatcaatcta	atcatctatc	tatctatcta	tctatctatc
53281	tatcWatcgc	aatcaatcaa	tcacaatttt	tctctattgc	aatcaatcaa	tcacaatttt
53341	tctctatcta	tctatctatt	gcaatcaatc	acaatttttc	cggctgggag	agggtggctca
53401	cacctgtaat	tccaacactt	tgggaggcca	aggcagggtg	attacttgag	gccaggagtt
53461	cgagaccagc	catgccaata	tagtgaaacc	ctgtctctat	taaaaacaca	aaaattagcc
53521	gggcgtgggtg	gcgagcgctt	gtaatccag	ctgaggcagg	aaaatcactt	gaacctggga
53581	ggtggagttt	gtagtgagct	gagattgctc	cactgcactc	cagcctgggt	gagagtgaga
53641	ctctgccaca	aaaaaaaaaa	aaaaaaaaaa	gaacaaattt	tcgtatgctt	ttatagaaaa
53701	ttcttctcca	gatctccaga	tcttttcttt	tttgattgct	ccttgctggg	cagggtctatc
53761	ccacaggcag	tatgcctaga	gtagcccccag	atctttcaac	agcttgcatc	tcagcactct
53821	tgtctctgct	cagttacctc	tctctagagc	tgttttctga	ccaccttaac	caaaatagcc
53881	acttcacccc	aaactctgag	tcactctcta	accoggtctt	tatttttatc	ctagcatgta
53941	ttacgtgaaa	ttgcattatg	attttactca	ctctgtccca	ttagaatgta	agctaattag
54001	aattctgtcc	cactagaatt	ccaattctgt	ccatttagag	tgtaagctcc	atgtggatag
54061	agtataaaat	taaaacaaac	tcagtttctc	ctattatttc	actcaacaat	caacaacaca
54121	caacacttct	gataccagat	gtgtgatggg	ttttccccac	atatcaagca	agctatcaac
54181	tgtgtctact	ggacaccagt	caagtgtcct	ctaattcaat	tcaattttga	tgttatctac
54241	ctggagatac	tgtcagatgt	tacaggttga	aggctcagtc	ccacaagact	gccttactt
54301	cagatgccaa	cagtaggtcc	aaggccactg	gccaactaac	tacaaaccag	ggttcccatg
54361	acctcatctt	caggttcaac	taatttgcta	gggcagctca	cagaactcag	ggaaatgtgt

54421	ttactgattt	aaaggatatt	acaaagaata	ctgaggaaca	ccagatggta	ggtatggaaa
54481	gctctggagt	cctcaagact	ggccatttaa	agatcgcatt	ctgccactgc	aattttaagc
54541	acgcaatacc	catgacaggY	cagatgatgt	ggtggctcac	gccagtaatg	ccagcactgt
54601	gggaggctga	gatgggtaga	tcagatcagt	taagcccagt	tcaagaccag	gctgggcaac
54661	atggcaaaac	cccatctcta	ctaaaaaaa	caaaaattaa	ctgggcatca	tggcaagcgt
54721	ctagagtccc	agctactcta	gggcgctRag	gcaggaggat	cacctgagcc	ttgggagggt
54781	gaggStgcag	tgggctgtga	ttggggcact	gcactccagc	ctgggcaaga	gtgagaccct
54841	atatcaaaaa	ataaaataaa	taaaaaatac	ccatgacatc	tctagaaatt	tttctgtgt
54901	gtccatttca	aattccacct	tttccacaaa	gtctcccctc	ataactttac	tagtctatga
54961	cacagtgtct	cacacctggg	gagcactcaa	atgtttgctg	cctgtaacat	ttactaaaca
55021	aactcttggc	tgggcatggg	agctcatgcc	tgcaatccca	gcactttggg	aggcctaggt
55081	gagaagattg	atggaggcca	aSagttggag	accactctgg	ccaacgcagt	aacaccctat
55141	ttctagtttt	tttttaaaaa	aatttcagat	gccgggcatg	gtggctcatg	cctgtaatcc
55201	tagcactttc	ggaggccgag	acaggaggac	tgcttgaggc	caagaattca	agaccaacct
55261	ggccaacaca	gcgagaccgc	atctcaaaaa	ataaagttaa	aaaaaaaagc	aaaaaaattt
55321	tagaaaacgag	ggtggggaga	aaactctcca	gccacataa	cttattccat	tcaattcttt
55381	ttgcactaag	gttagtatta	cacaaatgca	cattttgtgt	tctgtaattg	ttttatgtct
55441	gtataccttg	caccctatc	ttccctgttg	ccaaagacag	attttcttct	gtgtacacaa
55501	cccccaggac	agagcaaggc	accaacagta	attcccaaaa	taattttttg	attaaaactt
55561	ttggagtcat	actgtcatca	gccagaaaaa	aaaacatgcg	tgaggagaaat	gaaggggtgt
55621	aaaagagctc	aagctgatgt	cctRaaagga	ttactttatc	tataaccttc	ctgaacacta
55681	gccttttctc	gttgagtctg	catgKaaagt	ttttccactt	aaaatggggc	agcaaggctg
55741	ggaactagta	ggagtagcgt	aacttctcgg	actctcccac	tgaaaagcat	ctttttctta
55801	aaggcggaga	gcactttaca	gacgggtact	aaggtaaccg	Raaacagcaa	aactgagggtg
55861	gttctatcta	cggagaagaa	tctaagctcc	aaagttaaaa	tgcgagagcag	tggcgcatat
55921	cagcagacgg	cggtcactac	tgtggctcat	ttaaatctgt	gttcagctcc	gggcctcttt
55981	tttcaggaat	ccttgtttctg	ggacacccag	tggacagcga	aaggagagag	accaccacag
56041	gcaaacggcc	ggaaagccgc	gcagtcgcag	ccgcgcgcgt	tactccgcc	caaataagcc
56101	actaccgtca	ccaaccccat	ctcgttcgcc	cgagccgcgg	acctgaggga	gcgctgtcgc
56161	ctccccgcaa	gatgctcacg	cgaaaaaccc	actcttcagt	gtctgagacc	actccgcagc
56221	tttcggcctc	ggtgagcggg	tgaactaaac	ccgggaaacc	gctgaaagac	cccagcttcg
56281	actaggccta	gtcgtagcgg	cggccagcgg	gagggcgtag	ccgtagtctt	ggcccacgtc
56341	attctgtgcc	ccgggtcagg	tcaccgcccg	gagggtatgg	gaagagaaat	gaagaagact
56401	ggtactccca	gacccttccg	tatcgaggac	cccaatcaac	aaccacctg	gtgagcgcca
56461	tcttcttccg	cttcttccag	cgcgagcgac	agcaccgctg	ggcgggtctt	tccagatgat
56521	gaggagcggg	aaggaaggag	tgcgcgatgc	gcaggcgctc	tggccgaaaa	ggccttctgg
56581	gatttgtagt	tctttgaaca	ggagtaccgt	ttgtattctg	acSagaccaa	gcggttatca
56641	aggaataatc	tcttcagcta	gcaacaaatg	cataactcga	tcgcttatat	gcgacatgat
56701	agggcggttc	ctaggcaaaa	tatcaaagat	acaggggagat	gccttttagg	ccgctttatt
56761	acgttcctta	ctcagtcctg	ttccccgaga	aggggtacaa	aatacaaaaag	cttcccgggg
56821	acagMtRctt	taagtaagag	tgatagggcg	tttaaaacga	caggtaataa	tgagactagc
56881	taatggagag	tYcttggaact	ctctgaaaac	attcacactc	aaaacttttc	tttaaaccat
56941	atcctctcac	ccgccaaaac	actctcttgg	ggagatattt	cgtaatcctt	ggtaatttac
57001	cgagtgtctg	ggttctctgc	ccagggtatg	acaaggctga	aatctcatag	gaggctctgg
57061	agaaaaatcc	atctcctaac	tcattcttgt	tggcaaaaat	cagttcctgg	cggttgtggg
57121	atcgagtccc	ctgttttgtt	ttgtgctgtt	agtgggtggc	accctcagct	cctaggggtc
57181	actctcgagt	ccttcccaca	tgagccctat	ttattggtag	ttcacaacat	ggatatttgc
57241	tttctgaggc	acatctttct	gactcctctt	ctgccactgt	tggagaaaaa	tgcctgtctt
57301	ttaaagggct	catgtgatta	gatcaggagc	acctggataa	tctccctatt	ttaagatcaa
57361	ctcttggccg	ggcgcagtag	ctcacacttg	taatcctagc	actttgggag	gtcggggcgg
57421	gcggattgcc	tgagctcagg	agttcgacaa	agcctgggca	acatggtgaa	accctgtctc
57481	tactaaaaat	acaaaaatta	gctgggcggt	gtggcgcgct	cctgtagtcc	tagctactgg
57541	ggaggctgag	gcaggagaat	cgtgtgaatc	aggagacgga	ggttgcaagt	agccaagatc
57601	acgccactgc	actccagcct	ggcgacagag	tgagactgcg	tctcaaaaaa	taaaaataaa
57661	taaataaata	aataaataaa	taatataaaa	gaatagctgg	gtgtggtgat	gtgctcttgt
57721	tttctcagct	acttgggagg	ctgagggtaca	agaatcgctt	gaaccagga	ggtggagggt
57781	gcagtgagcc	gagattgcac	cattgcactc	cagcgtgggt	gacaaagtaa	aattctgtct
57841	caaaaaaaa	aaaaaaatca	actctgccac	accgcataac	agaatcagaa	tcttcatagt
57901	catggcccca	ggggttatgt	aggtcaggta	ctgtgggggt	tgggtgagga	ggagatcttg
57961	ggggatatcc	tagaattctg	cctgccacag	catgtaaacc	aaaaaaacaa	aaagaaaaaa
58021	tcttttggtg	aatacaggat	tgtaaatcac	atttgttaat	ataacctgca	tggcctggga
58081	gcccgaagat	tagagttaa	gatgtagctt	tggctgggtg	tgggtggctt	tgcctttaat
58141	cccagcactt	tgggaggctg	aggcggggcag	atcacctgag	gtcgggagtt	tgagaccagc
58201	ctgaccaaca	tggagaaact	gcgtctctac	tgaaaaataca	aaattagccg	ggcgtgggtg
58261	tgcttgcttg	taatcccagc	tactcgggag	gccgaggcag	gagaatcgct	tgaactcggg
58321	aggcggaagt	tgtggtgagc	cgagatcggt	cgtcggtgca	ctctagcctg	agcaacaaga
58381	gtgaaactgt	ctcagaaaaa	aaaaaaaaaa	aaaaaaagat	gtagcttcag	caccaataaa
58441	ttcttatagg	gcaagtcatt	taatttattt	gggccccagt	tttattgaac	ttaaaatgct
58501	gatcatgtta	tctgctttac	ctatatattt	ataaatgtaa	aataattata	tacaatacag
58561	cagagtatga	gccttaaatg	aggtaatgta	ggtggatatg	tttttactta	actcttaagt
58621	actatgtaaa	tatgttagtt	attacagtta	atatttttgt	tgacagtgat	ctacttcaac

58681	ctctgctcca	ggaatgtatt	atttctaaaa	ggagaaaaac	agagaagcaa	attatagaac
58741	gtcctggaag	ccaagatcaa	ggagcttaga	tttagttcag	caggtgattt	gcagctgaag
58801	gaggacttaa	gtagagggcc	tgggtcaaag	gaacaggcaa	gaaagacaat	tcttaaggca
58861	gaatgggttt	ctatggcaat	gagagacaaa	ggaggctact	gaggacaagg	ttaaaataat
58921	taacatggga	aatcagtaag	acatagacca	agacctggga	tgcaggattg	aaagaacagg
58981	gtggagaaga	gcttttgcaa	tccactctca	ttttccacag	aggcacatca	tgcaaggcat
59041	ttccaccagt	catagtccct	cgctgttttg	ggggtgtgta	aagaatagaa	actgacttta
59101	atagcaatcc	tatcaaaaca	attaagaaag	caaactctact	gcaaacgtgW	tacaatatta
59161	tacccaaagg	cctagtgttt	tctttgggtt	tgttggggag	ggggtttggg	gttaagctat
59221	gctgaatctt	cagtgcctat	ccatccctca	ttatcatagg	taattagcag	ctgcctgctc
59281	atgtagagag	cccagtgcct	gctggaatca	gtaatgcgcc	aggttgcaag	aagcaatcaa
59341	ttcactccag	tcttagaatt	ctggatagag	agtagaattg	ttctcagaga	acctagggcc
59401	taatttgatt	cctaagtagg	tgtggctatg	tagccacaag	taatatagct	tgtgagggtg
59461	tagggaggac	aagttaagca	catattcttg	agtcagcttt	cctgccttct	gatcccagct
59521	ccctaattta	tgagctgtag	attctggata	agtcacttct	ctctgtctca	gttttctcac
59581	tggccaataa	aaaggggtgag	gggcgtggaa	tcagtataac	ttatcctcaa	taaagctatt
59641	gggaggatta	aatgagttaa	tcatgtgaag	tgcttagaaa	aatgcccagc	atagagtaag
59701	cgctcaaaaa	ttaattatgc	tttctggctt	taatgaattg	gccttaattt	attaagggtc
59761	aggttttgca	tctgcaaagt	gaggcagttg	aactcaattt	tattttctggg	gtaccttccc
59821	actaacattt	tctactatag	gatgtttttt	taaatttact	tcaatgccag	tatttttatgc
59881	tctgatgcca	ttatgcttta	gttattatgg	ctatattatt	ataatcattc	tctgataaaa
59941	agtagagctg	ctccaccWca	ccgttcttac	tttttggtatg	tgttttacgt	gccctctcaa
60001	tgtttaaaat	tttttttttaa	ttaaaatatt	ggtttgcatt	aaagcatagt	taaaaaggct
60061	agagccaatg	attacttagg	aactgcgaaa	gaaataacgt	atctttacga	tggagagatt
60121	tggctgtcat	cacttttgct	tcactaacag	tggacaacatc	tgacactagg	tgcttttaat
60181	aggaagtcc	ccagttttct	ttctttcttt	ctttctttct	ttctttcttt	Yttttttttt
60241	tagaccgagt	cttctccgt	tgcccagggt	ggagtgcagt	ggtgcgattt	cggcttactg
60301	caacctctgc	ctccctagt	caagcgattc	tcctgcctca	gcctcccag	tagctgggat
60361	tacaggcatg	agcaagcacg	cctggcta	ttttgcattt	ttagtagaga	tggggtttca
60421	ccatgttggc	caggctagtc	ttgaactcct	ggcctcaagt	gatccacca	ccttggcatc
60481	ccaaagtgt	gggattacgg	gtatgagcca	ctgcacctgg	ccgRaagt	accaattttc
60541	tgatcaaacc	agacctaatg	tccagttcac	aagaaattca	ggggatagag	taacaagttt
60601	aaaagcatga	ggaaacaatc	agtaaaatcc	agaatgtgag	acattctaca	agacaactga
60661	ctgagactct	acaaaatgtc	aatgtcatgg	aatggatgtg	aatagaatag	atgaaaacag
60721	attgatgaga	catgacacat	aaaattagta	aaccttgatg	ggattctggt	tcagttgggg
60781	aaaactataa	aaaatattct	tgggacattt	ggagaaagtt	gcataatggag	tgataataga
60841	caacattgta	gaatttttgc	taaatttctt	aggagtatta	atgacattgt	ggttaagtag
60901	aagaacgttc	ttattcttgg	gagatgcatg	ccagaggatt	tggggatgaa	atgtgtcaac
60961	ttactttctt	cttttttgtt	tgttttttgt	tttgagacac	aattttgctc	ttgtcaccca
61021	ggctggagta	cagtgcgca	gtcttggctt	actgcaatct	ctgcctccc	ggttcaagt
61081	attctcctgc	ctcagtctcc	caagtagctg	ggattatggg	cgctgccac	catgcccagc
61141	taatttttgc	gttttttagta	cagacgaggt	tttaccatgt	tggccaggct	ggtctcgaac
61201	tcctgacctc	aggtgctcca	tccacctggc	ctcccaaagt	gctgggatta	taggcctgag
61261	ccactatgcc	cagcctcaat	ttactttcaa	atagtttata	tcaacaacaa	aaaatgtgtg
61321	tgtgtgtgtg	tttatagtga	gagagtgtga	gagagcatga	aagggaaagc	aaaatgttaa
61381	caattattta	agcttagatg	ggggagtgtg	gactgtatag	gtgtttattg	aactattggt
61441	tcaactttta	tatatatatg	aaaattatct	cttttttttt	tttgagacag	ggtctcactc
61501	tgttgctcaa	gctggagtcc	agtggatga	tcacggctca	ctacagccc	aatctcccag
61561	gctcaagcga	tactcctacc	tcagcctccc	aagtagctag	gactacaggc	atgtgccacc
61621	aggcctggct	aatttatttt	ttgtagagac	agggtctcac	tatgttgccc	aggctgggtc
61681	tgaactccc	gactgaagt	atcctcctgc	ctggcatccc	aaagtgatgt	aagccactgc
61741	accagccct	gaaaattttt	ataataaaaa	tttaagaaga	ggaaagtgtg	agaactcaca
61801	tttcccaatt	tcagaaacct	actacaaagc	tgtagtaatc	aagacagtgt	ggtactggca
61861	taaggataga	Ytcatagatc	aatggaataa	aattgagagt	cctgaaataa	acccatatgt
61921	ttatgggtgaa	ctgatttttg	acaagggtac	caagaccatc	taaaactatt	attgacatag
61981	ttttttcaac	aaatgggtgt	gggaaactgt	atgtctaaat	gcaaaagaat	gcagttggac
62041	ccttgcttca	cgccctatac	aaaaattaac	tcaaaataac	tcaaagacct	aatgtgaaa
62101	actaaaacta	taaaactctt	agaagaaaac	acaggggtca	atcttcatga	tcttggattt
62161	ggcaaagaat	tcttagataa	gatacaaaaa	gcataaacia	caaaggaaaa	aatagaaaaa
62221	ttggaYtaaa	tcaaaagtta	aggttttgtg	cttcaaagga	catcatcaag	aaagtgaagg
62281	gccgggcatg	gtggctcacg	cctgtaatcc	cagcactttg	ggaggccgag	gcaggcggat
62341	cacgaggtca	ggagatcgag	acgatcctgg	ctaacatggg	gaaaccccat	ctctactaaa
62401	aatacaaaaa	ttagccgggt	gtagtggcgg	gcacctgtag	tcccagctac	tcagaaggct
62461	gaggcaggag	agtggcgtga	acccaggagg	cagaacttgt	agttagccaa	gattgtgcc
62521	ctgcactcca	gcctgggcaa	cagagcgaga	ctccgtctaa	aaaaaaaaaa	aaaaaaaaag
62581	aaagaaagt	aaaagtccca	agaccttcag	gcaaacaaag	acattcctat	taggcatgac
62641	atttcaggag	tttagagatt	acttccaaga	agctaaggac	aaaagccaga	tctctctttg
62701	gacaagggtta	aatttggttac	tacagaagcc	ttgaaaacat	tatgctaaat	gaaagaagcc
62761	tgtcacaaaa	gaccagatat	tgtattatta	cctttatata	aaatgttcag	aataaaciaa
62821	tcctgtgggg	gtgttaggaa	aggtaataa	ttgttaatgg	gtatgagttt	cttttggggg
62881	agggttgaaa	aattagtggg	gacggttgtt	caactttgaa	tatactaaac	gcctctaate


```

62941 tgcatacttt aataaggtga ttttatggtg cgtgaactac atttcaataa agctgtagaa
63001 gcaaagttaa gtaaaatgca aaagtaataa aatgaataag tgaataaaaa gtataatata
63061 gtatctcttc atttttttcc aaatgaaatt tagaattatt ttgtgcattc tattgaaaaa
63121 tatctgtagg catttttgatt ggcgttgaat tgtccataaa ttaattttga gagagccaat
63181 atctttacaa ttttatgtct tctcactcaa gaacactggt tttggttttK gtttttgagt
63241 tggagtcttg ctctgttgcc tgggctggag tgcagtggac gatcttggct ccctacaacc
63301 tctgcctcct ggggttcaaga gattctcctg cctcagcctc ctgagtagct gagattacgg
63361 gcatgcacca tcacacctgg ctaatttttg tatttttagt agagacgggg tttcgccatg
63421 ttggccaggc tgggtctcgaa cccctgaact caagtgatct gcctgccKtg ggctcccaa
63481 ctgttgggat tacaggcgtg agccactgct tttggccagg aacactgttt agattttaac
63541 ttattaaaaat ctcccttcat atctttcaat aacattttga agttgtcttt atatagattg
63601 tacacatctt tcaggatatt aatttttgta tttcattttt aaaatcatga atgcaatctc
63661 tgtttttata tgattactaa atagaacagt aattttttat aagtaagtca aaaatgttct
63721 gaaacatgtc agtcatttta taggcagaat caattttttt aattttttat ttttattttt
63781 tacaggYatg atcaaccagg tacagaaatca gttttttggc tgtagatgat ttaagagtta
63841 ggggtcaactt gtcttttggtg agatgtgctc ctctatcttc ttctggaatt aagcagttct
63901 ttgggttgat gtagtaggaaa gcagtttttg tgtcagctac ttccctccat gagttctgag
63961 acttcctgtt taaaagcact acgaaacctg ctgaccccac ttctttcccg atttaattat
64021 tctttttgaa agttggctct aaccttaagg gttgtgaaaa cacaaggatc cagtgtggtt
64081 gaagcttttag aactaagaaa accattcctt tttctatcaa acagcctggc aggggaacag
64141 tttgcccctt gccctgagcc ctgtcatttg ttttgatcat tttcattcct atcaaattgt
64201 ctgttggccc agaaggcagc catctgatag ctgaagtgac tgcctacatt tcttccctct
64261 cttctccagt aacaagatat tccaccagaa tatgctgtt tgtaggctaa ggctgtgatt
64321 taataaccct aaggagataa acactgggat aataataatg gttattattt attgattagc
64381 ttctctatgc caatttatcc cacttattcc ttgtaacagc cctgtgagta gttaactctt
64441 tttatccaca ctttacagat aagaaaatgg aggccttagat atgtaagctg cccaagatga
64501 caaatagaaa gtgactaatc tggaaactta acccagagaa catgatcttt cttttttttt
64561 ttttgagaca gggctctcact ctatcgccca ggctgggggt caggggtgca atcacggctc
64621 attgcagcct tgacttcctg ggctcagctc atcctcctgc ctgagcctct caggtagctg
64681 ggactacagg cgaggcccac cagcccagc taattttctt attttttgca gagatggggg
64741 cccactattt tgcccaggct ggtcttgaac tgctgggctc aagcaatcct cctgcctcag
64801 cctcccaaag tgctgggatt acaggtgtga gccactgtgc ccggcccggg gaacatgatc
64861 ttaaccatac tgtcttccaa gtgaaagatt ctacctttct aagacatctg gagtcagaca
64921 gacctgagtt caagtcgtgc cttcctcccc actttactga accttcagtg agtctttcta
64981 cctcagaagg ctgtgaggat gccatggggg aatgaatgta aagtgtttta gtgcttggct
65041 gacactgagt actaaataaa tatcaattta ttcttcaaaa gtgtataaaa atgtatcaag
65101 tcctttctct gtactaaacc ctgtactaat ttgggggaat tcaaagttaa agtctgtata
65161 gtcttgccct aaaaactaat gggctgggac gggcacagtg cttcacacct gtaatcccag
65221 cactttggga ggctgaggtg ggcagatcat gagatcagga gttcgagacc agcctggcta
65281 acatatgaaa ccccatctct actaaaaata caaaaaatta gctgggcatg gtggcgggtg
65341 cctgtaatcc cagctactcg ggaggctgag gcaggagaaat tgcttgaacc cgggaggcag
65401 aggttgagct gagctgagat cacgccattg cactccagcc tgggcaacaa gagcgaaact
65461 ctccatctca aaaaacaaaa acaaaaatac aaaaccaatg ggctggtaca tctgggactt
65521 gtgggttgaa tctggccccc atacatattc tgtttgcctt tcacatgctt taaaactttt
65581 gaattagttc cagacattta aaagttggga gatthttggc gggcatggct gctcacacct
65641 ctaatcctag cactttggga ggccgaggcc agtggatcac ttgaggtcag gagttcgaga
65701 ccagcgtggg caacatggtg aagccccatc tMtactaaaa atacaaaact tagccaggca
65761 tgggtggcggc acctgtaatc ccagctacat gggaggctga ggcaggagaa togcttgaat
65821 ccaggaggtg gaggttgagc cgagctgaga tcgtaccact gtactccagc ctgggcgaca
65881 gagtgagact ctatctcaaa aaaataaaat ataataataa ataagttggg agattttgat
65941 ctgttcacct gcctttgaac ttcttaccce gacaccttct caagggggRt ggtgtctctg
66001 gcgatctcat cactggcaga ggaaggataa ctgaaccacg tcaatggcca agcctccata
66061 tattagtggc actcacatct ctagactctt cttggctcac cagacataca tgtaccttgg
66121 ggaccaccct tcaaaatgcc atcaacacag gctcctaaag taggacattt tacaccatc
66181 acccagttat gtaccaacaa taacataggg ctattccttc agatgaagag ctgagaatat
66241 gttagtttta aaatagaagt cagagtcagt gtggcagggt gaatttacag cctgtgtaca
66301 aaaaaaacca cacttaaatt cctgtttcta acaaagacca actaaaaatt cctcccaggg
66361 caataaagag aagcctccat aggtgagagt gtttctcttg agggaatcta gaaaagtga
66421 gggagaatga gtctagctcc ttccaacagg aggatagaaa cctatctaaa tgggcagggc
66481 cagactgagt tcataggaaa aataatttcc ttcatagtgg gtagattcta agacccccc
66541 cccaattttt tttgaggata tctcacaag gctcacaac agaagcccat tcccaccagc gatctgagag
66601 actgacttaa gcctatcctt aggttgagga tgaaagggac tttacttgtg gagttcaagg
66661 atttggcaga ggctgggtga tgaactctgc tccaaaccac aataccgctt cttaccact
66721 ttaaatccaa tctacagtca tgaactctgc gagttagtga ggatgcagag aaactggaat
66781 aggatagcta taaccaaata gacataataa ggtgcagcca ctttgaaaaa cagtttgga
66841 gcttgtacat tgcagggtgg aatgtaaaat atatgatatg gtttggtgt gtgtccccc
66901 gttcttcaaa actttaaacg gagagttacc tggtggggga gggacctgat gggaggtgat
66961 ccaaactctc tgttgaattg taattcccaa gttctatgat agtgagttct gatgtcctat
67021 tggatgacgg gggcagattt ccccttgct tgtgtggcac ttccccctt gctctttctt
67081 gatagtgagt gagatctgat ggtttaaaag cccctttgct ttctgccatg attgtaaat
67141 ctgccaccat gtgaagaagg tgctttgctt cccctttgct ttctgccatg attgtaaat

```

```

67201   tcctgaagcc tcccagtcac gcctctgtta aacctgcaga actgtgagtc aattaaacct
67261   cataccttag tacaccatat gacccagcaa ttccattcct tttttttttt tttttttttt
67321   ttttttttga gacaggggtct aactctgtca cccaggctgg agtgcagtgg tgcaatcaca
67381   gctcattgct gcctcaacct cctgtgctga agtcacctc ccacctcagc cttctgagta
67441   gctgggacta caggcccatg ccacctgccc tggctathtt ttttttttaa tttttggtaa
67501   agacaggatc tccctatgtt ttccaggctg gtctcaaact cctggactca agcaatcttt
67561   cagcctctat ctcccaaagt actgaggggg attatagggt tgagccactg ctcccagcct
67621   ctactcttaa tatgatcaag agaaatgaaa acacatgttc acacaaaaac ttatacgcaa
67681   atattcatag cagcattata atagctgaaa tgtggaagca gctcaaatgc gccacacact
67741   gatgaatgga taaacaaaag gtggtatata cacacattga aatattactc agcaataaga
67801   agaaatgaag tactgatacg ggatacaact tacacgaacc ttgaaaacat aatgctaagt
67861   gaaagaagcc agtcacaaaag accagatatt atataattcc atttathttga attgttcaca
67921   ataggcatat ccatcggaat gcagattagc agttgcctgg ggatagggcc ggtgaggtgg
67981   ggcaggaagc agggactgag aaagggaaca aacagcgagt ggatgggagt ttcttttttg
68041   agtattgaaa ggtaaaaagt tctaaaatta tataatgggt atgggtgtac aactctgtga
68101   ataactcatg aaaccactga attgtacaca ttgaaagggg gaattttacg gtatgtgaat
68161   tatactctaa tacatctgtg ttttgccag gcgtgggtgg gtggtggctc acacctgtaa
68221   tcccagcact ttggggaggcc gaggcaggcg gatcacttga ggtcaggagt ttgagaccag
68281   cctgatcaac atggagaaac cccgtctcta ctaaaaatac aaaattagcc aggcattggg
68341   gcacacacct gtaatcccag ctactcggga ggctgaggca aggggaattgc ttgaaccag
68401   gaggcagagg ttgtgggtgag ctgagatcgt gccattgcat tccagcctgg gcaacaagag
68461   caaaactctg tctcaaaaaa aaaaaaaaaa ctgtttttta aaaatatatc tgttccagg
68521   ttctcagac taccctaag ataaccagga accacaatgg acttttccct cttctcctc
68581   tattttaaaa aaatattcag ccaggcatgg tgttgacact gtaatcccag ccacgtggga
68641   ggctgagttg ggagaattgc ttgaacctgg gaggtggagg ctgcagtgag tcgagatcgc
68701   accactgcac tccagcctaa gcaacagagc gagactccat ctaaaacaac aaaaaattc
68761   atgagcctct ctttacttaa tttctttaa atgtttaata gtctgttaat taatttataa
68821   aattattatt aKtagtattt gagacagagt ctactctat tgccaggctg gagcacagt
68881   gtgtgatctt ggctcactgc aacctctgcc tctgggttc aagtgattct catgccttag
68941   cctcctgaat agctgggatt acaggcatgc accacaatgc cgggctaatt tttgtgtttt
69001   tagcagagat ggggtttcat catgttggcc aggtgggtct cgaactcctg tctcaagtg
69061   atctgcctgc ctacgtctcc aaaagtgtct ggattacagg aatgagccac agtgcctggc
69121   caaaaaaatt tttttttct tttttttttt ttcagagaca ggtctcact gtgtaacca
69181   ggctaaagtg cagtacacc atcatgactc actgcagcct cgatttcttg ggctcaagt
69241   atcctccac ctacgcctcc tagataactg ggaccacagg cacgtaccac catgccagc
69301   taggtgtatt agtctgttct catgctgcta ataaagacat atccgagact gggtcattta
69361   taaaggaaag aggtttaatg gactcacagt tccacatggc tggtagagac tcacaatcat
69421   ggtggaaggt gaatgaggca caaagtcacg tcttacatgg tggcaggcaa gagtgtgtcc
69481   aggggaattc ccgtttataa aaccatcaga gcttgtgaaa cttatttact atcatgagaa
69541   cagcagagga aagaactgcc cccatgattc aattacctcc cacggggtcc ctcccatgac
69601   atgtgggaat tatgggagct acaattcaag atgagatttg ggtgaggaca cagccaaacc
69661   atatcactag ggtttttttt ctttgataga gatggagtct cactatgttg cccaggctgg
69721   tcttgaactc ctgggctcaa gcaattctcc cactttggat tcccaaagtt ctgggattac
69781   aagtgtgaac cattgcgcct ggctcatgg cctagttaac tgcttctttt tttcccag
69841   atagagtctt gttctgtcac ccaggctgga gtgcagtggg gcgactcagc tactgcaac
69901   ctctgcctcc tgggttcaag cgattctcct gcctcagcct ccagagtaag ctgggattac
69961   aggcacccgc cactgcacct ggctcatttt tgtattttta gtagagatgg ggtttacca
70021   ggttgggagg gctggtcttg aactcctgac ctacaggtgat ccccccctgc agttaaactc tggacctcaa
70081   aaagtgtctg gattacaggc gtgagccacc atgcctggct agtcttttcc tcatagggta agtgtaaatc
70141   tttcctcagt tgaaaaatga ggataataac agtcctttcc gaacagtacc tagcacataa
70201   taaaatgacc acagatatga actatgttta aatatatgtt atacatatta atagtcatat
70261   attagatatt gtaataatta tttatatatt agtaagtgcc ctatRtaagt gttagctatt
70321   attacacccc taggatagta tttagcacat gagttgataa tgggttaact gtccaaggct
70381   aatattatca ttatttactt atttttatta ctgtttccag tttgaggtta caaatgcgta
70441   ttatctgttc tgctgttgat gaacattgag ctgtttccag tttgaggtta agtggtattg
70501   atgctgcttt gaatathttgt gcatcatttt ctctagggta tacacttagg agtggtattg
70561   tgaggcacag ggtatgttta cctccatatt tacagatatg ccaaaccgtt ttccaaagt
70621   gatgattcaa ttacatttcc cacctccagt aagaacctct ccaataactg ataggctcat
70681   ctttttaaaat tttaccctgg tatgtaatga cagcatcaat tttaathttgc atttttctgg
70741   ttactgatga ggaggagcac ctttgatttc cttctgtgta cattcctgtt caagcctctt
70801   gtccatttac tactgagtta tacgtctttt tcttgttgcg ttgtgagaat tcttcacatg
70861   gtttgggtac tgagtaattc tttatNtatt tcaatacctt ccactattct gcttgacttc
70921   tactctgcca gtggtatctt ttgtttttgt ttttgttttg agatggagtt ttgcttttgt
70981   tgcccaggct ggagtgaat ggtgctatct cagttcactg caacctctgc cttccatgtt
71041   caagcgattc tctgcctca gcctctcaag tagctgggat tctaggtgcc tgccaacacg
71101   ccgggcaaat tttttgtatt tttagtagag acgggggttc accatgttgg ccaggtgggt
71161   ctogaactcc agaccttaaa caatccaccc gccttggcct cccaaattgc tgggattaca
71221   ggtgtgagcc accatgcctg gcccagtggt tatcttttga tgaacaaaaa aatttaattc
71281   agaagtaagc aaatttatga atctttttca ttgtagttag tgctcttttt gtcttgttca
71341   agaaattctt ccctgtcctg aggtcttatc ttgtaaaagc tttatagttt ttccttttac
71401   acttaggtca tttccacctg gaattgaata ttgtgcacga tctgatatag gactgagggc

```



```

71461 aattttcaatt ttttctacat agatgctcaa ttttatcagc accattttatt aaaaagcctg
71521 ttctttccctc actcatctgc aggccatctc tgtcatgtag caagtgttat gtagcaaatg
71581 tcatgtattg atatgtttga gggctcttta ttttgttcct ttacaggaa gtctcccac
71641 cttgttctcc ttattcaata gtgttttgte ttgatccttt ttagaatctg ctaattaagt
71701 tccaccaaaa acaacaaga aaacaaaca aaccctaaaa tggacaacaaa ccattttccc
71761 agtcagtaga aatctcaaga tctaactgaa tggtagtgac caggactctt tcttttttca
71821 cctggacatg aacgaaaagc atgtagatth aggttctgtc aacagctgcc tcattctagg
71881 cacattagta taggggtgaa aacaacactc acagccgggt gcaggggctc atgcctgtaa
71941 tcccagcact ttgggaggct gaagcagggt gatcacctga ggtcaggagt tccagaccag
72001 cctgacaaac atgggtgaaac cccgtctcta ctaaaaatac aaaaattagc tgggcatagt
72061 ggctaacacc tgtaatccca gctacttggg aggtcaggga aggagaattg cttgaacctg
72121 ggaggcggag gttgcagtga accgagatcg ggccattgca ctccaggctg ggtgtcaaga
72181 gtgaaactcc atcatacacc acatacacac acacacacac acacacacac acacacacac
72241 acacacacac aggtcgggag cagtggctca cgcctgtaat cccagcactt tgggaggccg
72301 aggtgggagc atcacgaggt caggagtctg agaccagcct ggccaacata gtgaaacccc
72361 atctctacta aaaatacaaa aaattagctg caagtgggtg tgggcgcctg taattccagc
72421 tactcgggag actgaggcag gagaatagt tgaaccagg aggcagagt tgcagtgagc
72481 cgagattgtg ccattgcact ccagcctggg cgacaagagt gaaattccat ctcaaaaaaa
72541 aaaaagaaaa caacactcag aagggcagag ccaagagaat cactaagaac agagtccagc
72601 aatgtctggg tccttcttac ctctaagtg ctgcagttat atcgggttaa cttgggggtt
72661 ctgttattht caaaccactg aaagcatcct aacttatcca taagctatct taaatactgg
72721 cttggctgca gaagcaagta aaaagacctc ttcgtgaaaa ggaaaataac tgtcacaaaa
72781 ctattaatth tattctatgg gggccaacaa tgatataata atataataat ggtgatgttg
72841 atagttatag ataacaatta caaagccagt ccctatgcta aggtatttac agataatata
72901 tcattatact agtgatctta ttcaacggcc atgatctccc agtgttactc tttttagaga
72961 ggaggaaaca ggtccagaga tcttaagtaa ctctctcagt atcacacagt taatggaatt
73021 caaaggtagc cttgactggc tccagcacac ttatcaattg gtcttttaac taattattat
73081 tattattWtt ttttttttga gaYggagtct cgctctgttg cccaggttgg agtgcagtgg
73141 cacgatcttg gctcactgca agctccgcct cctgggttaa cgcattctc ctgcctcagc
73201 ctccctgagta gctgggacta caggcatctg ccaccatgcc cggctaattt tttgtattht
73261 tagtaaggac aggttttcac cctgttagcc aggataggt ctccatctcc tgacctcatg
73321 atccaccctc ctccgcctcc caaagtgtg ggattacagg cgtgagccac cgcgccggc
73381 cttaacttat tattaatat agcaaatgta aaacttccag gaggccaggt gtggtgactt
73441 atgcctataa tctcaacacc ttgggaggcc aaggcagggt gatcacctga ggttggaagt
73501 ttgagaccag cctggcgaac atgggtgaaac cctctgtgta ctacttgga ggctgagaca ctagaatgac
73561 aggtgtggtg gcacctgct gtaatcccag ctacttgga ggtgagaca gctactgcac tccagcccgg
73621 ttgaaccag gaggcagtgg ttgcaatgag ctgagatagt gctactgcac tccagcccgg
73681 gagctgttht aaaaaaaca taacaaagac aaaaacaaaa acttccagga caggcgttgt
73741 gggatcatgtc tttaatccta gcactttggg aggtcaggcc aggaggtttg tttgagccca
73801 ggagttcaaa actagcctgg tcaacatagt gagaccccat ctctataaac aacgtttctc
73861 ccatgctgtt ctcatgatag tgagtgaagt ctcaacaagt ctgatggtht tataaggggt
73921 tcttccccct tcacttggca cttctccttc ctgcccctt atgaagaagg tgtctggctt
73981 cccctttgcc ttctgccatg attataagtt ttctgaggcc accccagcca tgctgaactg
74041 tgagtcaatg aaacctctth cctttataaa ttaccagta attataaca acaactcagg
74101 cagttgttga tagcagcatg aaattggagt aatacagcct cctaaagtgc tgggattaca
74161 ggcagtagcc accacacgca gcctgcattt tttcatagat aaaatgttct acaagthtct
74221 gattgacatt tggaaattht agaaaagtac aagaagaaaa tttaaattat ccataatcct
74281 actctgcaga gataatcact attatcattt tatagtatat cctttgagcc ttttaataaa
74341 tatatgcaat agaaatccag ctgtgaatat tgttttgtaa tctgcttht ttttttttht
74401 tgatatggag tctatctgtc actcaagctg gagtgcatg tctcaatctc agcttactgc
74461 agcctccacc tcccaggtht aagcgattct cctgcctcag ccttccaagt agctgggatt
74521 ataggcgcct accaccacac ctggctaatt tttgtattat tgggtgcagac aagthtctgc
74581 catgttggcc aggtcgtctc cgaactcctg acctcaagt atctgcccac tttggcctcc
74641 caaagtgtg ggattacagg tgtgagccac tgcacctggc ctgctthtct aagatagtat
74701 tttttctagt cattaaaaat tctaaaatat tattattaat gtttgcaatg gtattthagt
74761 ttctaacatt tacttaatca gtgctctatt ttcactaaaa atttgthtgc atacacattc
74821 ttgaaaatct ttttttcaga caacactgat ttttttaaaa gtagaattac ttattaaagg
74881 aatataaaca tttacaagt ttttagtacta ccaaactgct ctccagaaag gctacatcca
74941 cttctgttht taccattagt gaggtagaat tcctcttht ccaaaacctt actctthtgc
75001 aagthttht ttttttht taaatagaca tggthttht ctgtcaccca ggctggagt
75061 cagtgtgtct atctcagcta actgcagctt tgacctctg ggctcaagcg atcctcccac
75121 atcctacctc agcctcctag gtagctggaa ctacagggtc actccaccat gcctggctag
75181 tttttcttht gthtthtgt tgagcccat gattcaata ctccacctg gtctctccct
75241 tgacacctgg agattatggg gattatgggg attacaattc aagggtgagat ttggttgggg
75301 acacaaagcc taaccatath agaggccaag gtgggaggat tgcttgagcc taggagtaca
75361 agaccagcct gagcaacaga gcaagattgt ccacaaaaaa aggaaaagaa atthtaaaaa
75421 gacaaagaaa acaaaaaata aaaaaagtha ttagatgaat gtggtggccc atgctthtag
75481 tcccagctac ttgggaggct gaggtgggag gatcactthg gcctgggagg tcaaggctgc
75541 agtgagctat gattgcacca ctgcactcca gcctgagcaa gagagcaaga cctctcaaaa
75601 aaaaaaaaaa aaaaaagaa agaaaattca aacatttht aagctagaga aaagagaaaa
75661 atgagatgaa cttgccccag cthtaattat tgtcaacaca aagccaatct tgctgtcat

```



```

75721 attcctttctc cctcactcac attatttttaa agcaaataatc aaacatcata tttcattttgt
75781 aaatatatttg gcatgttttct ctaaccaata agggctcctt tttatttttta tattttttttg
75841 agacaggggtt tcactccttgc ttaggggtgga gtatagtggg gtgatcatag ctcactgcag
75901 ccttgaactc ctgggctcaa gtaatcctcc tgcYttggcc tcacaagtag ctgggactac
75961 aggctYgtgc caccacgtct ggctaatttt taattttttg ttgagatagg atcttgctat
76021 gttgcccacg ctgggtctcaa actcctgagc tcaagcagtc ctcctgcctt gacctcccaa
76081 cgtgttagga ttacaggcat gagccactgc acctggccaa gggctccttt ttttaaaaac
76141 cacaaccaca gtacatgat cactctaaa tttaaaatag ttaattcttt aatatcatca
76201 aatatccaaa taatatccac attgccctga ctgtgttttt atgtgtttta tatattttat
76261 ctctttttact taYaggctcc cctccatct cttttttctc atgtaatat ttgttgaaga
76321 aattgggtca tttgcctgtt agtttgccat agccttggtt ttgttaattg tagctcatga
76381 tgttgtttaa catgtccctc atctgtctgt ttctgtataa ttcttcatta gacctagagg
76441 cttgatcaga ctcagagttt tttgttttgt ttgtgcagta cagtgggaga agggacgaag
76501 aaacttatca aggggaggca tttacttcta tctgaaggat ccagtgtctg atgggtctttc
76561 ttgtgatgtt agcaactgtt tatgatcatt gccacacca tacatcatta gggattgcaa
76621 attggcgatg ttcttattct attgtttctt ttccatttag tagttagaat gctccatatt
76681 ccaagagaat tttttcttta actatttagg tgctctttgg aagagatcac aaaggaaaga
76741 gaaaataaat acctgattct ttctctttta tgaccagttt taaaaataat taggtgcggc
76801 cgggtgcggg ggctcacgcc tgtaatccca gcactttggg aagccgaggc gggcggatca
76861 cgaggtcagg agatcgagac catcccggct aaaacgggtg aaccccgtct ctactaaaaa
76921 tacaaaaaat tagccgggcg tagtggcggg cgcctgtagt ccagctact tgggaggctg
76981 aggcaggaga atggcgtgaa cccgggaggc ggagcttgca gtgagcggag atcccggcac
77041 tgcactccag cctgggcgac agagcgagac tccgtctcaa aaaaaaaaaa aaaaaaaaaa
77101 aaaaaaaaaa aaaaaaatta ggtgctttcc tagcatgctt cagtgggtgac tgataaaatt
77161 tttttggtaa cgttataaac tcacagagtt aaataaactt aatatgcttt catccagtga
77221 tgttttttagc ctattgatgc tcaaattatc ctcttttag caagtagaag gttctccatg
77281 ttagcttctg agtccttttt aaaccaacc cattagtctt tgatggcttc cctgctttct
77341 ggtataaaag gtattccagg ctggggggcg tgactcatgc ctgtaatccc agcaatttgg
77401 gaggccgagg ctggtggatc acctgaggtc aggagttaga gaccagcctg gccaacatgg
77461 tgaaaccccg tccctgctaa aaatacaaaa aaattagctg ggcctggtgg tggcgggcta
77521 taatcccagc tacttgggag gctgaggcag gagaattgct tgaacccagg aggtgacagt
77581 gagctgagat tgcaccattg cactccagcc tggccaacaa gagcaaaaact ccatctcaaa
77641 aaaaaaaaaa aaaaggtatt ccaggatcat gttgtacatt tccatcccca gatctggaat
77701 gactcatttc tgtaagaggc cctgggtttct tttagtgggg caatttgcat gctataaggt
77761 ggtaagtga tgatttttaa aagtaagaaa taacagatac taggtaatga ataacagtac
77821 aaaactgata gaactatgaa ggtattgcag cccaagacc cattagttag ggggagatag
77881 tctcacaact taacaggccc tgaaggaatg aatgcactct aatatcata cacaccatca
77941 caYggatgcg agccttagtc cccaagaaaa ccttaaactc tathtagcaa acttatttta
78001 gaggtatgtg taaaacattt tttaaagttt catatatgga agccttagct gtctggaaaa
78061 ttagtgtaaa tagaatgctt catttgctca ggtttatggt gcagaaaaga atcatttagg
78121 gagcacgtta aaatataggt gtctggacca ggcaatggtg gctcacgcct gtaatcccag
78181 cactttggga ggccaaggca ggaggatcac ctgaggtcag gagttcgaga ccagcctgga
78241 caacacaggg agaccccatc tttacaaaaa ataaacaaaa ttagctaggt ggcacactcc
78301 tgtggtccta gctacttggg aagctgaggt aggaggatcg cttgaggatg ggggttgagg
78361 cttaggtgag gtgtgatggt accaccacac tccagcctgg gcgatagagc aaccctgtct
78421 caaaaagaaa aaaaaaaaaa aagtatggat ttctgggtcc cactcYagac aacttgaatc
78481 tgggtgtagg gcttcgaatt tgtatttttag taagccttcc aaatgatttt gaagtaggta
78541 gtccataaaa ctaacctttg aggaacattg ccagactgac tgatagaaag agagagagtg
78601 aataggggaa gaggagggaa aatgctttta aagagtgtat cttggttggg cgcagtggct
78661 cctgcttgta atcctggcac tttgggaggc tgaggcgggt ggatcacttg aggccaggag
78721 tttgagacca gcctggccaa catggagaaa tctctactaa aaatacaaaa aaaaaaaaaa
78781 aaaaaagaaa gtaaaaaaaa gagtgtatct tgcagcatat ttctgaggat taagccatgt
78841 tttaaaaatt tagtgattat Yggccgggcg cRgtggctca cgcctgtaat ccagcactt
78901 tgggaggccg aggcgggcg atcacgaggt caggagatcg agaccatcct gggcaacagg
78961 gtgaaacccc gtctctacta aaaatacaaa aaaaaaatta gccgggcgtg gtggcgggcg
79021 cctgtagtcc cagctacttg ggaggctgag gcaggagaat ggcgtgaacc cgggaggcgg
79081 agcttgcaat gagccgagat cgcgccactg cactccagcc tgggggacag agcgagactc
79141 cgtctcaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaattta gtgattatcg
79201 gccaggccca gtggctcacg cctgtaatcc cagcattttc ggaggctcag gcagggtggat
79261 cacttgaggt cagtagttcg agaccaggct ggccaacatg gcaaaacct gtctctacta
79321 aaaatacaag aattagctgg gtgtgggtgg gtgtgcctgt aatctgagct acttgggagg
79381 ttgaggcagg agaattgctt gaacccagga agcagaggtt gcagttagcc gagatcgcg
79441 cactgccctc cagcctgggt gacagagtga tactctgtct caaaggaaaa aaaaaatttg
79501 tcatctctct tttctgattt aaaaggattt tgttcctcca tggaaaactt taaaaatagg
79561 agcaagcaaa aaaaaataaaa aaaatttgta atcttaccac tcggagacaa tgttcatttt
79621 aagttgggtg atattcttcc agacttctaa aaggaattgc aattgctcct tttgtagcag
79681 acaccatcag ggacttgctt ggggcctctc atctagcaag tgggagagtc cacactggaa
79741 cccagctgct gaatcctgaa ctccattgtg ctccattgta ttttttattt ttattttaaa
79801 aaattaatta tttatttttg agacaaggct ctgttKccca ggctgtgtgg tgcagtggca
79861 tgatcacagc tcatggtagc ctccatctcc caggctcaag cgatcctccc accttggcct
79921 cccaaagtgc tggattaca ggtatgagcc accgcccccc attgtgcttt atcgtaacag

```

```

79981  gaacagaggg gctcacgccc actcctagca ttactttaca cacatgtcta ctgttaaaag
80041  acaaaactac aacaaattta gtttaaagat ctttaattggt ttttatttgc aattatagaa
80101  tcagccaaca cctcattcta gaaaatagaa tgagtaatga gtgttctgat gagctgagca
80161  ggagaggttg gctttatagg tagaagaggg ctgaagaaag caaaaatggg ccgggcgcga
80221  tggctcagac ctgtaatacc agcactctgg gagtctaggg cggacagatc acttgagttc
80281  aggagttcga gaccaacctg accaacaatgg tgaaaccctg tctctaccaaa aaatacaaaa
80341  attagctggg tgtgatgggt cacacctgta ttcccaagta ctcgaggaggc tgaggcagga
80401  gaatcacctg aacctgggag acagaagttg cagtgaagctg agattgtgcc agtgcactcc
80461  aggctgggtg atagagttag accctgtctc aaaaaaaaaa aaaaaaaaag aaaaaaaaag
80521  gaaagcaaaa acagagaaca aaatggagat tgggtgtttt caagttactt tccttaaaaga
80581  gttaaaacag aggtgattac tttattatgc tgactccggt tgactggaat cttctgtttt
80641  gttttgtttt aaaagagaga tggagtcttg ctttttggcc aggttgggtc ggaacttctg
80701  acctcaagca agtccccac cttggccttc caaagtgtct ggattacaga agtgaaccac
80761  catgcccagc tggaccctcc tattttgttt tgttttttaa ggaaaactgg cctgttttag
80821  tttcactgtg tggcacttag cacatgtgac tccattcttg tttggcctgg tctgatgggg
80881  ccagtgagc gaggtgtgtc caaatgaYgg cctcccatta actttgcttc acaccgcaca
80941  tcacttggtt aattaactgc acaattacaa caaaaaataa tgtgcctact actgaactat
81001  gggcttctca gtagggcagg aacatcatct tatttatata agtatccttg gaacacagcc
81061  tgggtgctta ctgtggctca atacctggaa cacagtaaat acacaataaa tgatccttct
81121  gggcaggggg caatggagtg aaaacaacta ttctccattg cctctcacag aactgaattg
81181  cagccatcct agacttcaaa actgatctag ttttctcccc aaaaaacagt ttgcagcact
81241  ccaatgtcca agaaatagaa tatcctaaac gaattagggc aggaacaaaa aaccaataac
81301  cacatattct catttgaaag tggagctaa acatcagata ttcattggaca ttaggatgac
81361  aatggtagat gcgggagact actagagtcg gggaggagag agggggcaag ggttgaaaaa
81421  ctgttgggta cctgggtgac gggatcattc ataccccata cctcagcatc acgcagtata
81481  ccaggtaac aaacctgcat atgtacccSc taaaactaaa atccagattg aaaaagaagg
81541  aaaaaaaaga agaaacagaa tatcttcctg aaagccttat aggggaacat gcagaagaaa
81601  gcaaatcctc ttagcatctt acccccttac ctaagcaaca gggcccctga cataaatggg
81661  atgacccgcc tccaggggtg gattggaaag ccagcgcac cttttctctc tttagcctac aaacagctac
81721  caggtttaga aacaaaagcc tggctgtctc gaaacaaaag catacaggag gaataaaggt ggatttaact
81781  tacttggatt ctgagtgttt gaaacaaaag ataccaatca aaatgaagaa atatgttttt cagcttcaat
81841  gacagtcttt tggaatgtaa ataccaatca aaatgaagaa atatgttttt cagcttcaat
81901  acaatctact ttggtttatg agagtgaaaa gtctgatgaa atacatagtt ataaaaatgt
81961  gaaaactcct aaggaagtaa atctgtacag gagaattggg gagctgaaat atttcccagt
82021  actgttttat agtcttcttt ttctttgttt ttctttcttt ttctcccagg aaacatttta
82081  ttggatgtgt tcatttatgt atgcacgtat gtgttcttcc aaatggttgt tttcctggaa
82141  ccaacttcat gtgtgggttag cactgtgcta gatactagct gcataataaa tgaatgtgaa
82201  agttgttgac atataggact gatttttact attcattgac cccttcgaac atttatttgg
82261  ctgctatgat tctatgctta gaaagataca tataatctaa caaatacata caattttgag
82321  gagttcatga tccctagaaa gcctcccagg ggtcaacaaa ccagaactgg ctgggcgcag
82381  tggctcatgc ctataatgag tactcctgag gtgggaggat cactggagcc taggagttca
82441  agaccagcct agacaacatt gggagattcc atttctacaa aaagaaaatt atctgggtgt
82501  ggtgatgctg gcctgtagtg ccagttactt gggaggctga ggctggagga cctcctgagc
82561  ctggaagggtc gaggtgtcag tgagccatga ttatgtcact gcactccagc cagggaaaca
82621  gtgagactct gtttcaaaaa agaaacccca aaacaaacaa aaacccaaca gaatcctgct
82681  ctaagaacct atagttaaaa aagcagcagt gtaggctggg cacggtggct catgcctgta
82741  atctcagcac tttgggaggc cgaggtgggc agatcacttg aggccaggag ttcaagacca
82801  gcctggcgaa acactgtctc tactaaaaaa tacaaaaatt agctgagtgt ggtgatgcac
82861  gccggtaatc ctagctactc tggaggctga ggcacaagaa tcaattgaac tcaggaggtg
82921  gaggttgagc tgaactgaga ttgcgccact gcattccagc actccagcct gggtaatgag
82981  agactccgtc ttaaaaacaaa acaaaaacaaa acaaaaacaaa acaaaaaccaa gcctgtaatc
83041  atggctgagt aataaaaaaag gttttggctg ggcgcggtgg ctcatgcctg taatcccagc
83101  actttgggag gctgaggcag cagcagatca cgtggtcagg agtttgagac cagcctgacc
83161  aacatggtga aacccgtct ctactaaaaa tacaaaaatt agctggatgt ggtggtgggt
83221  gcctgtaagc ccagctgctc aggaggctga ggcaggagaa ttgcttgaat ctgggaggcg
83281  gaggtgtcag tgagccaaga ttgtgccact gcactccagc ctgggtgaca gagcgagact
83341  ccatctcaaa aaaaaaaaaa aaaaaaaaaa aaaaaagctt tgaccaatgc aagatcagtg
83401  tgtgctagag tggctagaag aaagtcacag agttcggccg ggcatggtgg ctcatgcccc
83461  taatcccagc actttgggag gccgagatgg gtggatcaca aggtcaggag atcgagacca
83521  tcctggctaa cacggtgaaa ccccgctctc actaaaaata caaaaaaaa ttagcYgggc
83581  ggggtgggtg gtgcctgtag tcccagctac tcaggaggct gaggcaggag aatggcgtga
83641  acccgggagg tggagcttgc aStgagccga gatcgcgcca ctgcgctcca gcctgggtga
83701  cagagcaaga ctccgtctca aaaagaaaaa aaaaaagaaa gtcacagagt tgaccttaaa
83761  ggctgggcaa gatttgaggt gYgcagtaga cagaaggagg caggggtagg gccagcaaag
83821  gagcaaggag gcagacagca tggaaatagg gaggggccag ctggaaggag gtcattgtca
83881  tggcaagtct cgggttcggac ttcacctgat agattgacca ggttttctcc acagtgatac
83941  tgttgacatt tggaaactgga cagttctttg ttgtgaaggc cagttctgtg cattgtaaga
84001  tgtccaacaa cacacttgac ctctgccac tagatgccag tagcatctcc caagtcatga
84061  caatcacaaa tgtctccaga cattgccaaa gatcccctgg gggacaaaga tcacctatt
84121  tgagtatgac tgtcacagca tatttgagct tggcaatgtt ttccaaagtt tagtcattca
84181  ggtatcacct tcacgaattt tgccagatct tgggtgcctcc ttcttggcta tctcctgtat

```


84241	ttattttat	at	aggggac	agaggctgag	gcaggagaa	cKcttgagcc	caggaggcag
84301	aggttgca	gagccgagat	caggccactg	cactttcagc	ctgggtgaca	gaatgagact	
84361	ccatctccaa	aaaaaaaaa	aaaaaaaaa	agtaaggatt	tacttctcct	cagatgttgg	
84421	caaaaaaggt	ggaggccaaa	gacRattggc	ctcttcctcc	tacagagagg	ccaactcatt	
84481	ccctgtgcc	tcacatggt	agtagctctc	ggggcagatt	gcaagacccc	tcctctttca	
84541	ggattgaatt	cccccttggc	atgtgtcaca	tcttcatttg	cctttctttt	ctgatgagag	
84601	ggtcatcacc	acttcctgat	ctcctttctt	ggcaacagaa	gggtgatgtg	agatttaatt	
84661	tctcaaaaa	actaaaaaag	atgccaaagat	ccccaggatc	cgtcccacgt	gggccaagat	
84721	cttctttggg	tgcagagggg	cagtgcagac	aaaggcactt	ggatcgcttg	cgatgggtcc	
84781	tctctctcta	attatagaaa	gtatttagct	attattccct	aattgctcac	tgcagttggg	
84841	tttgagcatt	tttttttttt	tctgacaaaa	ggctggtttc	tgatgagttg	ttcttttctt	
84901	tcgccttgg	ttcactgcca	taccagtgcc	tggctcttcc	actggaaaac	tgcaggaggt	
84961	ggtatgggat	ttctggggaa	gccactttac	ctcatccaat	tgctttcatg	gcttcccagt	
85021	tgccataatag	gaagggaatt	aacattttact	gggcatctat	ttagtatgtg	ccaggcactg	
85081	tgctaagtgc	tcacgtagg	tgtcttattc	aatccttgca	gcaaacttSa	gaggcagata	
85141	taattattcc	Raatttatag	atgaagaatc	taagggtgaag	gtagtctcag	tcagtatgtg	
85201	gctgagtcag	aattcaaacc	caggctctttg	tgtgtgagtc	cttttttttt	ttttttttga	
85261	gacatgggtct	cactctgtca	ctcaggctgg	agtgcMgcgg	tgcaatcttg	gctcactgca	
85321	gcttcaacct	cctgggctca	aacaattctc	ctgcctcagc	ctcccaagta	gctgggacta	
85381	cagggtgtgtg	ccaccacaca	tgggttaatct	tgtttttattt	tttaatgaga	tgggctctca	
85441	ccatgttgcc	caggctgggtc	ttgaacttct	gggctcaagc	aattctcctg	ctggagtcag	
85501	tctgggcaca	gtggctgagg	cttgtaatcc	cttcccaaaa	tgctgggatt	gtgagctact	
85561	gtgccagac	tgactccatg	ttttcctctc	tcaaaagt	ttctagactt	ctggctgata	
85621	aaacattgggt	gttgggagact	cccgctctct	tgccctaaaa	gtgcttattt	ctaggtcctc	
85681	tgctagtgggt	agggcttgggt	ggggatgcct	ataggacgct	taaaggagct	ctaggtttcc	
85741	tgttttgggt	catgacacat	gaagggaattt	ccagtgtcat	ggtagcaagg	acgaggagga	
85801	aagccatcSc	tcctgggggt	gtagcagtaa	ggatcctatg	ggaaacagat	ggcacattca	
85861	ggggtttaca	tgcaaacag	aatattcaat	gaatggacta	cttagcagag	ttatgggcag	
85921	ttaaaggaac	caacaagcaa	tgggggaagct	accgggtact	ggcagcagca	ggaagccatc	
85981	accaccccta	ggtttaaagg	gacatgggtgt	gagaatgggtg	ttcctgaagc	ccattgacag	
86041	ctggggggtat	ggcagaagca	tccagacagg	agctgtgaca	ggagggaaac	ccagccactg	
86101	cccgaacacc	agcaggaagg	gcagcagcag	ctgggtgtgtg	agtgtgtata	tatacagaca	
86161	tcaggtctc	tcctctctct	gccttcccat	ctgctcatgc	taccactggc	caaaccacgc	
86221	tagaagacag	agagtagggg	agcctagaga	tgcagctctt	gcaggtcagc	ctcctgaggc	
86281	acagggcagg	aaggaagggt	ggagagagca	cctgggaaga	tacagagagt	gttcagcaca	
86341	ggggctgact	cacctgtgcc	atccacagca	gtgtcttttt	ttttttNgag	atagagtctc	
86401	tctctgttgc	ccaagctgga	gtgcgggtgat	gcaatctcag	ctcactgaaa	tctttgcctc	
86461	ccgggttcaa	gcgattcttc	tcctctcagcc	tcYgaatag	ctgggactac	ataagtgcac	
86521	caccacaccc	agctaatttt	tgtattttta	gtagagacgg	ggttttgcta	tgttgcccag	
86581	gctggtctca	aactcctggc	ctcaagtgat	ccaccctcct	tggcctccca	aagtgctaag	
86641	attacaaatg	tgagtcacca	cacctggccc	agtgtcattt	ttttgggtgag	tggagacata	
86701	ctctatagga	agtgggacat	tgtttacagg	ctcaaagaat	catggaatgt	gagagtggga	
86761	agtgccctta	gagctctacc	tgtaaaaatc	ctttacttta	taaagaggat	cctgaggccc	
86821	aggaagggga	aaggactgggt	ccaaggctcag	ttgctaattc	gtggcatggg	caggactgga	
86881	agccagcttg	cctaacttcc	agtccatact	gcttcttagt	tttgagctgt	agtcaattaa	
86941	tgggttggtaa	taaaggatta	ctactgagcc	acttgacct	tttcctgtta	agacctcagg	
87001	gtatagttta	ctttggcccc	agacatttgc	ctcaaatgat	tctttctcta	aatatatcta	
87061	tgatcagagt	aggctgcccc	tttcagagtg	tgggctctgg	agtcaggctc	atggggctga	
87121	atcccagccc	tatccttaca	gaatgggtctt	ggacaagtta	tttaaccctc	caccttattt	
87181	tgctcaactg	taaaatgagg	ataataatga	tgtctatctc	atatctcatg	aggattatat	
87241	aagaagatat	atttaaagca	cttagactag	catctgccaa	taatgagtgc	atgataaata	
87301	acagtataca	tgtgggggtgt	gtgtgtatat	atatatatga	tgtaaacaaa	tatgtgtgtg	
87361	tgtgtatgta	tatgcatgta	tgtgtatata	tatgcatgta	tgtgtgtgtg	tgtgtgtgta	
87421	tatatatata	tattctaccc	cccaaattag	tttagaattc	tggttaagaa	ttcacatgggt	
87481	ttggctgggt	gtgggtggctc	atgtctgtaa	tcccagcact	ttgggaggct	aagggtgagca	
87541	gatcacttga	ggtcaggagt	ttgagactag	cctggccaac	atgggtgaaat	cctgtctcca	
87601	ctaaaagtac	aaaaattagc	cagggtgtgat	ggtagtgtgc	tgtagtccca	gctacttggg	
87661	aggctgaggc	aggagaaacg	cttgaacctg	ggaagtggag	gttgcagtga	gccgacattg	
87721	cacactgcac	tccagcctgg	atgacaaagc	gcgactccat	ctcaaaaaaa	aaaaaaaaaa	
87781	gaattcatgt	ggttggctgg	gcaagggtggc	ttatgcctgt	aatcccagca	cttagggagg	
87841	ccaaggcagg	tggattgctt	gagctcggga	gtttgagacc	cacctgggaa	acttgatgaa	
87901	ataccatctc	tatcaaaaat	acaaaaaaaa	aaaaattagc	tgggcattgt	gggtgtgtgta	
87961	tgtggctccta	gctacttggg	aggctgagggt	gggaggatct	cttgagcccc	ggagggtggag	
88021	gttgcagtga	accaagattg	tgccattgca	ctactccagc	ctgggcgaca	gagaccacat	
88081	ctaaaaaaa	aaaaaaaaaa	aagaattcac	gtggctgtga	ttgaggctcag	gcatgggtgg	
88141	gtgtgcctat	agtcacagct	acttggggagg	ctgaggcagg	agaaacgctt	gaacctggga	
88201	ggtggagggt	gcagtgagcc	gacatcacac	actgcactcc	agcctggatg	acaaagcgag	
88261	actccatctc	atgcctgcac	tttggggaggc	tgagtaggga	ggatggcttg	agcacagggg	
88321	ttcgagatca	gtctaggcaa	catagggaga	cactgtcttt	gcaaaaaaat	acaaaaatta	
88381	tctgggcatg	atgcaccacg	cctgtagtcc	cagctacttg	ggaggctgag	gtgggaggat	
88441	tacttgagcc	tgggagggtca	aggctgtagt	gagtgcggca	tgattgcgcc	actgcattct	


```

88501 agcctgggca atacaacaag accctgtctc aaaaaaccaa ccaaccaacc atacttttta
88561 cccttattga aatatatcag ttgttctttt aaacattttt ttcttttaat ttttttttta
88621 gtagagacaa ggtctcacct atgttgccca ggctggctct aaactcctaa gctcaagcta
88681 accttctacc tctgcctccc aaagtgtctg gattacaggc atgagccatg gctcctggcc
88741 ttatcagctg tttttcacat ggaatttttc ctttccctat aacagataag aactctgaag
88801 ggcttaggtg atgtgccttt tctgggattc ctcagcagtc agaggcagat aaatccttgt
88861 tctcaggctg ggcactgtgg ctcacacctg taatcccagc actttgagag gctgaggcgg
88921 gcggatcacc tgaggtcagg agtttgagac cagcctggct aacatgggtg aaccaggtct
88981 cgactaaaat acaaaaatta gccaggcatg gtggtgcatg cctgtaatcc cagttactcg
89041 ggaggctgag gcagggggaat tacttgaact tgggaggcgg aagttgcagt gagccgagtt
89101 tgtgccgatg cactccagcc tgggcaacag agtgagactc catctccaaa aaaaaaaaag
89161 aaaatacaag tctgactctt cacatcataa gctggctgtg gtggctcatg tctgtaatcc
89221 cagcactttg ggaggctaaa gcggatggat catttgaggc caggagtttg agaccagcct
89281 ggccaacatg gcgaaaccct gtctctacta aaaatacaaa aaatcaggcg ggcgtgggtg
89341 cagggtgtctg tgatcccagc tacttgagag gctgaggcag gagaatcgct tgaaccgggg
89401 aggcagaggt tgcagtgagc cgagatgggt ccgttgactc ccagcctggg tgacagaatg
89461 agactcggtc tcaaaaacaa caataacaac aacaacaaca acaacaagc aagtttgagt
89521 cttcacatta agcctgtacc actgttgtaa catgggaaga catgaagaag aaatgatctg
89581 agctttaatc atttatattc ggacataagg tccaccaaga taaagaacat ctgtaccaa
89641 ctgccccctc cccacaaaat tcaagtattg ataagtgatt ttaaataaat tttataaata
89701 aaacagtgtg aggaggtaga gtgtgtctca gggaatgtgg gggtagtggt ggagataggg
89761 gtaattgggg atgacctctc tggagRgtaa cattagcaga gaacaaattg ccaggatgga
89821 gcagaccatt gaagatatgg gggaatagca agtgtaacgg ctgccagat agcagccagc
89881 ttggcagatt gagWacagaa aggaagctga tgcggttgga gtggagtgag ccagggaaga
89941 gaagggtggg aaatgaggct ggagagaggg agtgagcca gcctctgggg agccaggagg
90001 gtcaggctga aggggtgggt tgcccccca cactgtggg tgtttctcgt aaggtggaac
90061 gagagacttg gaaaagaaaa agacacagag acaaagtata gagaaagaaa taaggggacc
90121 cKggggacca gcgttcagca tatggaggat ccgccagcc tctgagtttt cttagtattt
90181 attgatcatt cgtgggtgtt tctccgagag ggggatgtgt cagggtcaca agacaatagt
90241 ggggagaggg tcagcagaca aacacgtgaa caaaggctct tgcatcatag acaaggtaaa
90301 ggattaagtg ctgtgctttt agatatgcat acacataaac atctcaatgc tttacaaagc
90361 agtattgctg cccgcagtgc ccacctccag ccctaaggcg cttttccctc atctcagtag
90421 atggaacgta caatcgggtt ttataccgag acattccatt gcccagggac gggcaggaga
90481 cagatgcctt cctcttgtct caactgcaag aggcatgcct tctcttata ctaatcctcc
90541 tcagcacaga ccctttacag gagttgggct gggggacggg caggcttttc ccttcccacg
90601 aggccatatt tcagactatc acatggggag aaaacttgga caatacctgg ctttccctagg
90661 cagaggctcc tgcggccttc cgcagttttt gtgtccctgg gtacttgaga ttagggagtg
90721 gtgatgactc ttaaggagca tgctgccttc aagcatctgt ttaacaaagc acatcttgca
90781 ccgcccttaa tccatttaac cctgagtttg acacagcaca tgtttcagag agcacggggt
90841 taggggtaag gtcacagaat ctcaaggcag aagaattttt cttagtacat aacaaaatgg
90901 agtctcccat gtctattttc ttctacacag acacagtaac aatctgatct ctcttgcttt
90961 tccccacatc aggc aaagag tttggatttt cttctcagtg tcatgacact cctctgaaca
91021 gcaacattca gcttccaaag cacttgccac attgcaactg atcctcaca ggcctttgag
91081 gtagatagga ctgacaatag tattaactcc attttatcaa gacagaaact aaagctctgc
91141 caaaattaga aaacctgctg tgagtcaccc agttcaaata agattctttg actctaaatc
91201 ggggttttta acctcagctg tgcattgaaa tcctacaggg agctctacaa aatacctatg
91261 actcagtcct attcccagta gttgaagggg tgctagtgcc agctatggcc caggaagact
91321 tttaaagctc tccagggtgat tttttttttt agactgggtt tttctctgtc acccaggctg
91381 gaatgcgggt gtgggtgcaat catgcctcac tgtacccttg accctctggg ctcaagttat
91441 cttcccacgt gagcctcctg agtagttggg attttaggca tgagccactg tgcctggccc
91501 ttattattat ttatttttta atttattatt attttttgag atggagtctt gctctgtcac
91561 ccaggctgga gtgcagtgac atgatctcgg ctcactgcaa cctctgcctc ctaggttcaa
91621 gcgagtatcc tgccttagcc tctagagcag ctgggactac aggcgtgtga caccacgccc
91681 agctaagttt tgtattttta gtagagacgg ggtttcacca tgttgccag gctgggctgg
91741 aattcctgac ctcaagtgat ctgcctgcct tggcctccct aagtgtctgg attacagggt
91801 tgagccactg cacctggcct aatgctccct tttttctgtt cctaagccac tttgttcata
91861 cctcaatctt aacacttctc acattatttg gaagttatca atcttcttat cttaatgcct
91921 atacattgca aacttttagat ggtgggggct gtgttattta actctatact actgctacct
91981 ctgtgctgca attatctttt tttttctttt ttagtgaccg ggtttagctc tctctctgtt
92041 gccagctgg agtgcaagtg caagacYcat caaagctcac tgcagccttg aactcctggg
92101 ctcaagatcc tccctccctg gcctccagag tagctgggac tacaggcatg cgccaccatg
92161 cccagctaat ttttaatttt tctgtaRtct catagggctt ggctatgttg ctcaggctgg
92221 tctctaactc ccagcttcaa gcgattctcc tgccttggcc tcccaaactg tctgggttac
92281 agggataagc cactgtgctc agtctatgct gYctttcaat aaagacaagt gcttaaattt
92341 aatgtagttt aaatttatca aagttttatt tacagtttgt gattatggca cttataaac
92401 cctaccctga gatcataagg atgttttctt ttcttgtaaa agttataatt ttggggaacg
92461 atagtaagaa gaaaaaaaaa gttgtaattt taaaatgctt taatttcccc tgaagtctt
92521 taacctacct tgaattagtt tttgcatagg ggatccaaca ggtaactggg tgttccagcc
92581 catgtactga atactctatc ttccctcact gaactataat tccagccata cctcatttca
92641 tagatgcctg catgtttggg ctctgtaggt ggttccattt cccctctgc ctttccctat
92701 tccaatatca catggtctta atttgtatag ctttataata catgttgaca tggaagggtg

```

```

92761  cgtccttgaa acacattttt cttcttcaag aatgttttgg ctatgctttg ccttaaagtg
92821  gtgKtttttt tttgtttttt gtattttttt ttttttttga gacaaagtct cgctctgtca
92881  cccaggctgg aattcagtgg tatgatcttg gctcactgca acatttgtct cccgggttca
92941  aggattctct tgccacagcc ttctgagtag ctgggattac aggtgtgcac caccatgcct
93001  ggctaatttt tgtatttttag tagagatggg gttttacat gttggccagg ctggtgatga
93061  actcctgacc tcaactgatc cacctgcctt agcctcccaa cgtgctggga ttacaggcac
93121  gagccactgc gctgcccttt gttttttcat acacactttt gattagtttg tgaaggcca
93181  gaaaaaatta tgttggaat ttgattggaa ctgcattgga ctgatagatt aattcccca
93241  tgaaaaaat agctcaagag atgtttatag aataaaciaa cgtctgaggc ctggcgtggg
93301  ggctcacacc tgtaatcca gcactttggg agccaaggc cagaggatgg cttagcacag
93361  aaattcgaga ccagcctggg caatatagt agaccacacc cccagcttt tcttgagaaa
93421  aaatttaaaa aatttagcca ggctggcag tatgtgcttg tagtcccagc tactccacag
93481  actgaggcag gaggtacct tgaggacagg aagttgaggc tacagtgatg gagcctctac
93541  actccagctt gggcaacaca gccagaccct gtctcaaaaa aaaaaagaga aatgtttttg
93601  atacatgtct tcaaagtgca tcttataagt caacatttga taatggagat cagtgaatga
93661  atgaataagg gccaaagata actaagatta gctagcata t tatatttatt tatttattta
93721  ttttgagacg agYcttgctc tgttgcccag gctggagtgc agtggcccaa tctcagctca
93781  ctgcaacctc cacctcctgg gttcaagcaa ttctcccacc tcagcctccc gagtagttgg
93841  gataacaggt gcccgccact atgctgggct aatttttctt tttctttttt ttctttttgg
93901  agacagagtc tcaactctgt gcctaggctg gagtgagctg gcgtgatctc agctcactgc
93961  aacctccgcc tcccgggttc aagcgattct cctgcctcag ctctcctgag agctgaaatt
94021  ccagacgtgc accaccacac caggctaatt tttgtatttt tagcagagac agatttctact
94081  atgttggtcca ggctggtctc aaattcccgg cctcaagtgg tccgccacc ttggcctccc
94141  aaggtgctgg gattacagga atgagccacc gcaccggct taatttttct atttttagta
94201  gaaatggggg ttactatgt cggcctggct ggtctccaac ccctagcctc aggtgatctg
94261  cccgcctcag cctcccaaag tgctgggatt acaggtgtga gctactgcgt cctgccagc
94321  cagcattatt attattattt ttgagacgga gtttcgctgt tgttgccctag gctggagtgc
94381  aatggcgtga cctcggctca ccgcaacttc tgcctcccg gtttctagt cctcagcctc
94441  ctgagtagct gggattacag gcatgcacca ctaggcctgg ctaatttttg ctattattag
94501  tagggacggg gtttctccat gttggtcagg ttggtctcaa actcccagc tcaggtgatc
94561  tgctagcctt ggctgctgg gattacaggc gtgagccacc gccccgccag catacatcaa
94621  ttgtcagtaa atttcttctt cgcctactag ttccaatatc ttatttaaaa tctatggccc
94681  ggtgaggtgg ctgaggtttg taatcccagc actttgggaa gtcaaggcgg gtggattgcc
94741  tgagttcagg agttcaagac cagcctgggc aaaatggcga aaccccgta ctcctaaaaa
94801  tacaaaaaat tagcagggcg tggtagcaca ctctgtaat cccagctact caggaggctg
94861  aggcaggaga atcacttgaa cccgggaggc ggaggttgca gtgaggcgag atgggccaact
94921  gcaactccagc ttgggcgaca gagtgagact ctgtctcaaa atgaatgaat gaatgaatga
94981  atgaatgaat aaaatctacg aggtcgggcg cagtggctca ctcttgtaat cccagcactt
95041  tgggcgggcg gatcatttga ggtcaggagt ttgagaccgg cttggccaac atggtgaaac
95101  cccatctcta aaaaaaatac aaaaattagc tgtactgctt gggcgacaga gcgagactca
95161  gtctcaaaaa aaaaaaatct acaaattcac ttcacttttc attaaacacg aacctgggac
95221  gtagttagaa tgtcttgaaag aaaatatttc agtaatatcc caagtccgtc gccctggcaa
95281  agcaacaagg ccacctgacg gagtaagccc gagaccctg tgcctccaca gtactgcccg
95341  cgggatcgcg gcgtggggaa ccaggaacta caagtcccgg caggccgcgc gcgcctcggc
95401  ttcactaagc gcagtcaggt ggctgtcccc gcacgggttc cagctaattc cccgctaccg
95461  gggtgcgggc ggaagccggg cgcgcgggct ctgcttccct cgggggtgag aggggcagct
95521  cgccggaggc cggcgagag ctcgggccga ccagcctggc agggccgcac cgcgcctgga
95581  gcgcgaggga accggcatgg acacgccggg agtcggcctc tgctccgggt gtgcagccgc
95641  cctgggcgcc gggagggaca gccccatgac cttgtcacct gggcccggcg cgcggccaag
95701  tggctcgggt gactcgcat gccccgcccc cctgcagtga cttctccagt ttggcacacc
95761  agtgggcttt catgtgacct gtccacttca gtggcacagt cttgcaggca cccgagtggg
95821  cagagctgga ggaggcccg aggtggctca cccagacgcc ttcacccctt ggtggccctg
95881  tgagttccga ggcagaagca gctggagctg gagcgtgggtc tgggcaagag cagggggcga
95941  tgcccatatc ctggccctcc acccggctct gcgaacgtgc cccagaccgc tgcttatctc
96001  cagcatcttg caggccctg ggcttccaga tcacacagta gatatgtgct aacagcagcc
96061  agtgtgtgtg gagagcaacc tttagataag acacctagaa cagccctctc ccagggttaa
96121  gtggcattta ctttctacta acaagaaagt cattcaacaa gtatttattg ttacctcca
96181  tgatacttgg cacttagtag gtgctcaaga aatatttgca gagttgaagt gaattagact
96241  ttatctgtgg ctccatatgt ttattttaat aattttcttg gggctggatg tgggtggctga
96301  tgccctgtaat cccagcactt tgggaggcca agatgggagg attgcttgag ggcaggagt
96361  caacaccagg ctgggcaaca tagtgagact cccgtctgta ttaaaagaaa aaaaggaaaa
96421  taaataaaaat aattttctta ctacagtggg tctcaaactt tagcatgcac cagagtcacc
96481  tggagagcta gtaacaacac acagtactgg accccatccc caaagtctct gattctgtaa
96541  gtctggtatg agSaccaaga attggcgctt ctaacatgca cccaagtgat gcagttgctg
96601  ttgggtctggg gaccatacgt tgagtaccac tgctttatag gaaaaaaaat cctgtgaact
96661  taaagcacta tctcttcaca cctgggttac ggtctttctg tctttatttg ccagttttac
96721  ttttttgggt attgtaaata tgtgcatatt actttgtaca ctgttaactc cctccatatt
96781  aatttatata cagattttta tgtagtctat acttgtcatt ttcctgggtt acatcatatt
96841  ctaccttatt gggtcattct ttgcttggcc atttctcaac tggcctcagg gatgtgcgat
96901  ttgatctgta ctagaagagt gtgcatatcc ttactttctg Mtatgcagtc attttcttgt
96961  cagacaaagg acctgtaaga atattagttg gggccggggt cggtggctca cacctgtaat

```


97021 cccagcactt tgggaggctg aggtgggcca atcacttgag gtcaggcggt caatgccagc
 97081 ctggccaaca tgggtgaaacc ccatctctac caaaaataca aaaaaattac ctgggcgtag
 97141 tgggtgtgtgc

ERG genomic sequence (SEQ ID NO: 7)

>21:38783451-38882000

1 tgacagattc taaagtgttg tttcaacagt ttcttcttcc tcaaagggtga gcatcatgtg
 61 cacactgtca aaattaaaaa aaaaaaaaaa aagacccaat aaaacccgat gaaacccaaa
 121 gagcatggag atgagaaact cactgctggc tgacgatctg aatgaatggc cttgggggga
 181 atgtgaatgt ggaggtagca gaagggtcct gtcttcagtg cttgattctg Watcaatact
 241 tggtaaattt aaaaaacaaa aaaccagca agggagattt taaatcatca aggcagaagg
 301 atttaaaaag tggaatgtgt taaatgcaag agtgcgggat ctttgcataa agttattata
 361 ttttcaaaaa ttcgacaagc attgttttta ccaaactgtt ttaaagtaac agccctgagg
 421 ttaatgttat gattggattc tgatgtggca ctttaaaaaa aaatcatttt gcttggcctt
 481 agcatttctt ttcaaaatgt ctctgtactt atctgtgtac aacagcagat taccgttctt
 541 cccagagttt aattccatga acaccctgct gaaagacttg ttaaggcctt atggaaaact
 601 ctgacctgcy tgttcattat tgacgcccac gacgagtgcg aggaagttga tacttgggat
 661 gaggaattt aaatcagcag ctgatctgga atctggaagc actgcccctt ggatctcgcc
 721 aaatatggaa agaattcttg tcaactgagc aatatagaat tcagtgtctg agttttacct
 781 cttgaatttt ctagaacttt gttttgatta gccacctaga gtataagaat tgctgcctat
 841 gggatttttc ccagaagagt agataacata aagtaaccag cRataataat tttcattatc
 901 caattatttc atgtgtctcc ataacactta atacatcatg tttctctgca cagtaattcM
 961 ctatgtacag ctagggtgaa tagcaggaaa aaagagatca gatgataaag agaagggaga
 1021 cagatttgtg tgacttgtat aagatacttc gcctctctaa tcctttgtcc ttatctgtaa
 1081 gaaagcagca gtaccaggc tgctgtgagg atcacatgag acattatgag agtttagcac
 1141 aggacttggc acataacaag cagttattag gatgatgtta gtttgatta tgaMttcaag
 1201 atactacagc tacatttttt atactttctt aaacatcaat ttaagtcaat ttaattaac
 1261 gttattttac taggagaaat gtctctaaaa acataagaat tctatttgaa gtctacaatg
 1321 ataattacat tactctgata tcttaacttc ctctttatga tttcaaataa ttaaaattta
 1381 agtttatgtt ttcaacaagt gcttattgaa cctctactct ttgccagtca ctgttgagga
 1441 cacagaagaa atggataaga tatcactaaa aacagcttct gcgatatcag tgggtataca
 1501 taaattattc aactcaaca acaaacacaR gcaaagctgg gagaatgtgc tgacaggaaa
 1561 gaaaatgaag agtgggagag tggacagatg ggaatcgatg tgaaatttta taaaacatgt
 1621 cttggccaag ctgagtaggg gaaatatgtg gaaagtaagc tagaccaaac agRgaataaa
 1681 agtataaata agaaaaaaa tccagaggtc acagtggacc actagccaaa atgggttcac
 1741 agcaaacaaa caaaaaaatg taatgaaata ctaaaattaa agaagtacaa ataaaaatga
 1801 gattctgttc ttatctgtca gaatggcaaa gattcaaaga gtaaaatatt cagagttgtt
 1861 atgggtgtag tgtggaactg gtctcatatg tggctagaaa aaggggagaa tggtataatc
 1921 cttccagaga ataactctgg aattattttt taaattggca aatattttaa tttggcaaag
 1981 acttaaaaaa tatatatacc cattggctca ataattcctt tctaggcacc aatactaata
 2041 aaaagtattc aaaaaattaa atagatgggt tactgcaata taatgagtga aacatYgcaa
 2101 gcagcatcac tttatacact aggatattgg ttataaaaatg gtaatacata ttttagatag
 2161 aatataatga acaaaaaatt ttgcttatca aaaaatgtta gtaacatggg aaaatgcttg
 2221 taaaacaatg ctaactgaga agagcaggac aggtaggtag atacaaggcc aaacagatac
 2281 acacRgtgga gagacatatc ccaattgtta ggaatttgct gtggttggtt aggatctgaa
 2341 caatttatat tgactttgtg atgactttta aacgttttct ctaccataag aattttttat
 2401 gtttataaatt tatgctaaag aacaagatgt attttttgta attcaggagt aaagaggaga
 2461 gtgggggtatt ccagggtgct gtccctgccc taaccaggag cacgatgcag tcataggcct
 2521 ctgccctcct ccagcagcct cggctcagaa caggacgaag ccaaccctct ctgaccagca
 2581 ccacctcggg cgacccctgg acgctccacc tgcccctgtg tgtggtacct gccctgctac
 2641 acctttaaca agcaccctcg caagctccct cctccttctt tccctgtcct gtggctgccc
 2701 agaccagat gtaccctgcc tgggtgtggg aggcgcaca tcagagcagt ctatggctgt
 2761 gggcttcaca gctgaagctg ggccgtggga aatgttgaga cgagtgagtg cagagcctga
 2821 aagacaatac ggtagaaaag gttacatccg cgggggggcy tctgatggca tctgccattt
 2881 attgaggatg ggtgcgagac agggtagcca ttatgatccc attttacagg tgacgaaact
 2941 gagatcagac aggttagcta ccttgcccag ggtcacaaca ggaaggaagc aaatgcaagt
 3001 gtgtctgcgg ccacgtaagg tgagagaagc gctatcaggg gtggtctgac agaattccca
 3061 ggccagggag cagttgtcct ctatcctgtg gggcacaagg aggggacaag aaggctctcc
 3121 ttgaggtagc tccaaagaaa agaccccgcc agagcacagt gtgctacca acgctggaac
 3181 agcctggaga ctgtccctgt ctcttctctg aggtttctca tttcagagaa actctcatcc
 3241 gtctggcttc cccatggccc ttactctgtg attctcttat gtatcagctg ttaaaccaat
 3301 aaatccgcca aattgttggg atgcctataa tggctttggg tctccactcc cacagaggga
 3361 atcttattct aaagtcttaa atgtatcagt catattttcc tgaagacaac agaaatgggt
 3421 gtttcattta cttattttta tgtatgcttt ttcaagagtt gtaaacctgt gtttgtgttt
 3481 aaataaagat ctgttttgca aaacaaaaac tttatgagat aatcacttat aaacgtagat
 3541 aattaagaaa tggttcaggc tcagcacatt gtctgagagc attgcagtcc tgcactgtat
 3601 ttcattggggg aagaaaagcc cacagatgga gccatttctc atcctgcttt ccagggtcac
 3661 tgagtcaggg tgccctggcat gcatgggtgc atgcacacac aggcagaggg ccaggagaaa


```

3721 ctgtgctgtg tccacagagg gcagcctgga tcacagagct gaccaagaac ggaagcagca
3781 agttgtttta aagtagttgc ctgtaaagcc acttttcggc aaggacaaac actcagagca
3841 tgctctgaaa tgacttatgc acagcagggc agcggcattt tgcccctggc cttccttcca
3901 ttctcccgga atccccctaa agtaacaagg actgacgcaa ttcgtatttc acttagccaa
3961 caggttgatg aaaaatcata aatctgtagc tattaaactc attaatcaca tccatcaaaa
4021 ttctgtgagg agttaacttt cttcatataa ctcttagtct taattaagtt tccctcacat
4081 gtgatagcaa acgttcaaga agtgcaaatg tgcagacgtg gcgtatataa tgcaagcttt
4141 atgtctttta attaataaaa ttgagtccta tcaggtcgtg tttcaattac catcaaacct
4201 tccaacctct gttaattcaa aaaaaagtaa cttctttagg caagtcatgg aaatagcact
4261 aggggtgccct caggtctcca ccaagccttg ttagtaactt tccatgtcct gtctgatttt
4321 taagatgctt tcccctgatg ctgctgccgg ctgctggctc tctccacatc cttcaatgtc
4381 agatctctgt gatgatggaa aatccccac actccctttt tacacattaa gtatctttct
4441 aggatcagaa cttgcaacct ggggttcattg ttctccttaa aaggctcggg gagaggactg
4501 tatttctgtt gtaattctat gtatttcttt ttaggcacca gaaagtatta ttctgagaaa
4561 ggactgtagg cttcactaga cttcccaaat tgcagatggc attaaaaaaa aaggaatcag
4621 gaaagtcttt gggaaattag gctaaaactc ctaactgaag cacaatcgag ttttcagtgc
4681 aacagcagga tccctgcagt ctgtagcaaa cactgagatg tttgtgggga cagtggggcc
4741 ggtgagggtt agcacctctc aatatgttca gatgtcacca atgcccagg gaagcaccaa
4801 aaccaatcag tgaattgtct gcaaaccatc agctttgttg cttccaagtc tttactagaa
4861 ctcttaagct gatcttaaaa ttcacagaca cttagagata aatgaacact ctcacataag
4921 ttcccaaaat tcttttactt cttccaattg aaacattttg ttcccaattt caagttacca
4981 agggaaaatg atggtaagaa tcacaaagac tggatacgaa tatttagctt ttcatagtgt
5041 ctcatagggt cttacaaatg ttaatgcaaa aaaataaaaa ctccactcaa atgcagaaaa
5101 ccaacttaaa aaattcagag catctgatac ctaatcgact aattgattta tttactgaaa
5161 caacaaaaaa acagagtgc ttagagactgg aaattgcctc tatggggggc tgtttcctaa
5221 ttccagtga cagccatcat tttccctatg ctaacttggg ctttgcgcta acgtaattga
5281 aactgtagtc aacagactca ggacctcctt tttccactct ataaacaagg ctgtaaaatc
5341 atctcattac tttacccagg aaatctaaca gaaacatgtc ttaaaggaag tcacctataa
5401 agagggccta ttttaacaga agattaaaaa aaaattcacc tgtagtcatt ctaagggttc
5461 acttgggtac atacaataaa cacataatgc aatgtaataa aatgttaaat caagcatagt
5521 accttagaca agtgtaaact attatttcca aaaaagtgtt cagaaaatca caaaatattc
5581 aaactttcaa aatagcttca tgtattcata aatgtatact tcaaattaaa cagtataaca
5641 catttggtatg ttttgcaaaa tgtacctacc ttctaaagga tggctctgta tttcaatgtc
5701 ctttttaatg cactgagttt tttgggaaaa aaaaccacat aagatcgtac ccaagctatt
5761 caagatttac acagaatatt tgatttaaca tgcataatgaa taaggatgaa aataagaaca
5821 aaaaaataac attttgggtc acaaaatcaa gtaatttcta ttcattgtagc taYaagtagg
5881 gcacattaac tctcaatttt ataattcctg tctataggag ccatatttca gcagattcca
5941 atccttgaag ccaaagaaag aaaagtataa ggtgaaagtt cttggtacac agatttttaa
6001 tatattattg aacacacctt gagaaataaa agctgaactt ctcaaacaca gtttctatgg
6061 tacatatgag tcaaattctc taatacaaac atttcaaatt atgaaaatac caaaccaaag
6121 agtatttttg aaaatggctt ggcccaattc tgggcaaact tccattttct tatgcacttt
6181 ccaacaaact aaaagcctta tgaaaacacc accaaatgct tctcacctcc gtgcagcaaa
6241 actaaagaca tgcaacaaac acaattttct tttccctcca ctcagcatct gcttttgttg
6301 ctgatttttc acatttctac aaatgtcacg aaggcatggt ggcctttaaa acaactgaac
6361 ggaccccat tcaagactgc atgccccttg acttgtagtc accattaaat tggcttcatt
6421 tccaggaatc aggcataatt taggattgta cctgtgcaga tttacctcca cattaatctc
6481 tacatgctat ctactaaaaa cttaggcaag gaaatgcac agaccaaca cccacagca
6541 cagagaaccg accggccatt gctttccaat ctccgcaaac ctaaccattg ctggaagaaa
6601 tcttactcac agtgcacaga cagtaggtat tttattgaag ataaacatat agtggacaaa
6661 accaaattac ccccatattg gttacgtgag cactcagttc tcagcgtgga tgtcccacaa
6721 atcaagtcaa catttgcgtc ccattaccag cagccacttg ccgagtatct cttcgttcc
6781 actgggactg cctggcatcc ctgatgctaa ggagccactg aagagcctcc aaatgtctga
6841 cattcacaaa cgcactcttt gctttgacct gacccttcaa cctctccgag tctgctgcct
6901 tttctcagac acacatccag gcaccgttag ggatagttag agaattctgaa aattcagaag
6961 cgctccgaaa agcctttcca aaagtaatcc acagcactca acagtgaatt tagaaacccc
7021 aatttttttc tgagtttgaa gtttttaagc cttgcggatg gttggagtag gaaaaaggaa
7081 atttactagg cagtgc aaag gaaatcttgt tgtcctctat tgtggcagtg ggggtgttgc
7141 ccaaccctaa cttatctgcc ttgataaagg aaaccaaga aaagagtaac aagaacaaga
7201 ttttgtcaaa ttaaaaggaa ccctttcctt accttaatag tgctggccat aatgcRatca
7261 agtttattga tcgttaataa atgttaataa taattattgc ttctctctga ccagaaagta
7321 gttttgatga ggttgttttag agcggatgag attgtgctaa gtctgggaaa tgaagtcagc
7381 caatggcagg aagaggtttc tattggctct ggctgtccag ccaaagaaa caggatattt
7441 gggagtggag agataagaga ccctgaaaac aatgtttgtt ttcttgatga tatgcagcca
7501 ggagattttt tttttttaat taaaaaaga aaaggcatca attgggatgg ggactgccac
7561 agcaggtgtg accggtgtgc cgccgtgtga cacactgcac tgagaccaag gcaggatgca
7621 gatgtgatgg gactccgcat ggcttcacac gggctgcaag caccttggag ccaaggcgtt
7681 gagggcacc cactgccttg ggtgtcagcc cttcgcagcc caattcttcg cagaattact
7741 aggacagagg acttgagctc ctttctccta aaaggaaact ttgcaggtgg agtttatttc
7801 atgttaatag atggccatgt tcagtaacag ccattgcctg gctgattttt aacaacctat
7861 atttattcaa catttcatat aagtgttcca gaacagtttc attttctcct tccaaatacc
7921 tgcacttttt atttgctcta caacaaagtt gttgaaaacg caaggactct aggcttacag

```

```

7981 taaacacRaa aaataaagag gaaaaataaa ccttcctaag tcttggttttc aagtatttat
8041 taaaacccaa ataactgaag tgactacaaa tgtcccggaa tatcagttag ctggtctcac
8101 tctgacagac atccatgttg cagacaacag atccatcatag aacttttggc taccagagaga
8161 tgccatgtga gggcccccatt acatgtctaa aatccaagct ataagttcag ggtcacaggt
8221 cKgtttttctc ctcgaaggaa gtacagcgaa tgcaggcctg aacattcctt agagggtttc
8281 aggactttta ttactcattt tcaggaaatt gcttggaaga aacattttgc tttgaatcta
8341 gctacaggaa cgcaggaccc ataaagaggt gtggtctcaa Yaggcgaccc caagaacaca
8401 atagactaaa tcctgagtca tctgacaatt cctggttgca gagctggacg ttcagtaaata
8461 ggatttccact cagacttttag gccggcatgt gtcagagttc tgtccaccag cccagggtcat
8521 tctggctttt attatatacc tctgatttat cacctcatgt taggacaaaa gaaggaggag
8581 aaggagaaag ataagggggg aaaggagag gaaggagag agaggagga gggagggaag
8641 agggcgagaa aaaatggaga aggagaaagg aaggacagaa gagagagaga aaggaaggag
8701 gatgggagga agggggagg aaggaaggag aaaggaggag agggaggga agaaagaagg
8761 aaaagaaaag aaagagagta tattgtaaga aaatcattct gtggaaatca gaaYctaagt
8821 tctcagcacc tacattatga ggggggtgtg atttccgctc ttttcatctc tgaacaatga
8881 ataagatggc aggttgatta aaattctgtt tcccNgaaaa tttcaaagtc ctgagctgtt
8941 ttatctgggc agcttccact agaattctgg agtgcgagg agaaaagctc tctcagcttc
9001 cctgagtgtc cttgcttttt gttctctcct aagaagcatc aatgtaaaat gttaactgtg
9061 gcctccacaa cacatggcac ctgattatgc ctttaccaaa caccagcttt aaataagatg
9121 aacgctttgc taatgaaata gccacggaag aaaatcctgt gtggtcccgc ctcaccacg
9181 cctcgtggtt gctaataccag ccctcagttg ttccctgcag caggaaagat cagcatttct
9241 actgggacct aatgcttcag tgatgatttg gccttaactc cctggttctt gcctaataga
9301 aatcaaactg tgaagagtgg gatttcttac ctctctatatt tgaaataatt tccaacttac
9361 agaaaagcca caagataata caccaaactc ctaataacct ttgcctggtt aactctgatt
9421 gtctactggg gccaatgtac atcattttct ctgctttctc tcacacatgc tctctctctc
9481 tcaatctctg tctctctctc ccataattat ttatgtataa catacatgca tgcataatc
9541 catcattttc taactaataa aaatattgtt ttataagaga caaatttatt tattggatac
9601 taaaaaagag aaaaacagat gctattatatt gatcaatatt cRatccataa gttttactgc
9661 gtctaatttt ggaaatgcat acaaacataa aaagtgatct aataaaaagt taatttgggg
9721 atactgagtg gtaaatctctg ttccaaaatt ttacaaagga aactcctcct catttctaata
9781 gacaaaatgt ttgattgatt cctgttgtct tcaaagagaa taattcttga tgtttcaaat
9841 ggcacatag catccaagcc tggtaatctc tgactattta atgtaaagt ttttaaaaaa
9901 aWcttttggt cttgatagga caaggcacat cttttttttt tttttttttt tttttgggac
9961 ggaatcttgc tgtcgcccag gctggagtgc agtggcgcga tctcggtcga ctgcaagctc
10021 cgcctcccag cttcacgcca ttctcctgcc tcagcctccc gagtagctgg gactgcaggc
10081 gcccgccacc acacctggct aatttttttt gtatttttag tagagacggg gtttcacat
10141 attagccagg atggtctcga tctcctgact tcatgatcca cccgcctcag cctcccaaag
10201 tgctgggatt aaagacgtga accaccacgc ccggccaagg cacatctatt aactagaata
10261 tagcagtgca gaaaccgttt cccaaatatt atcctatggg gaaattatct gaagatatag
10321 atatcactct agctttcctc acttgtaccc caagtctatg ttattaaatg gcctcatccc
10381 tacaccaccc agcagcctaa gaaccaggct gcctttccca cctgatacct cctctcccta
10441 gggaaatatg ccctccaagc caccacgcgg accaagttag ggggcaatct ggcacacggc
10501 ccctacctga ggcccgctct gccatgagcc tatcagggca gggtcctttt tcaactctct
10561 tgagatgcag taatcaccac actagaccag cacagcccat acagtagctg tggacagcRg
10621 aacctatgaa taaagcacac atttcccttg catgttctc tgccacaaac ccatccctg
10681 tgaatctgcc aaaaccttcc actagtctcc tcacatttta ctccaaagaa agaaacaaaa
10741 taatataaca taaatatacc ataaattcac tgtcacataa aaagaaacac tagtatttat
10801 ttatcctaaa atcattttct cccattttct aaagatcgaa caagttctca ttcttggtcc
10861 ctactaact tctctgtatg gaatatgggg aggaagggtta ggagctaaga acactctgaa
10921 tgacagYcac atggttctca atgtaataca tgcgcagagc aaagagagga gatccgtctg
10981 aacctccaca tctgtgggga cacaacagaa gattcactca tgactcattc aYgtctttat
11041 ccctgcccta tacatcccta caatggaacg cccttccctc tcaaaaacat tgcaggaaaa
11101 tgatgtcgta gatgaacact tagcaatatg gaaaactgct ctgatatttt acctgggttag
11161 ttaaaaaatc acagtatata ggagaattat atccatagac tcatttttgt aaaaataaaa
11221 aggcagtttg ggatggccgt gcatctgtgt ccaaagcatc tgtgaacctg aggaatagac
11281 accatgagcg aagctaacct tcccaggttg aaaaatgaaa tgcaatgggt gcagacatgt
11341 ccaaggaata ttatggggac tcatccctt tatgaatctt gtcataagat aatgtgtgga
11401 gatgtcaact agttggcagc agaacagtat tggaaacggt gtaatacaag gaaatagtat
11461 catcatatta gaaacttttg aatgagtata aataatggct gttcaacaga aaaacccatg
11521 tcccctctcc aaagggcctg tttcactata tgtaaaaatt aggtcatgta tgttttcata
11581 ttagactttt tgttaaataa cttttttttt tttttttttt gagtctcact ctgtcgccca
11641 ggctggagtg cagtggcgtg atctcagctc actgcaagct ccgcctcctg ggctcatgcc
11701 attctcctgc ctcagcctcc tgagtagctg ggactacagg tgcccgcac caccctggct
11761 aattttttgt atttttagta gagacaggtt ttcaccatgt tggccaggat ggtctcgatc
11821 tcttgacctt gtgatccact cgcctcagcc tcccaaagtg ctgggattac aggcgtgagc
11881 caccacgccc ggccaataac cttttgtaat agtcaaaaaa taaaaataa ataaaaaggc
11941 aaagtaaaaa tattgacagc tatatcttat aataccaatg gcagagaagc tttttgtttt
12001 ttcccctctt cttcttttgt tcaattatat tttcaaaaaca taaatttgta ataaacataa
12061 attatatcct aatataaaaa tatgtaagta acatgcaatg ttgttcattt ttgtaaatat
12121 ctgaaaaata caggcatgtt ctgtaaaaaag tgcagccac aatacttgta ggtgtcaaac
12181 ctttttagcat gcccaaagtc ctgttctttt ttaaattgtc acagcaagca tagagctctt

```


12241	ttttttttt	attttattaa	gaaaaccag	aaacgctcaa	gagtttcgtg	gaggccatct
12301	atgcggcatt	aatccattca	ggtgatatta	atggcctttt	cctgccagga	actccagtgg
12361	gcactcagga	agccaggatt	acagggctct	atccagtcac	cgcattgtctc	ggcattcggg
12421	aagcctatct	cagtctcctc	aaattctgca	cacataaaac	ttcagagcct	gggagcgacc
12481	catgaaacgc	aggtttttaa	ggacaaaaca	ataggacaaa	agtgtgtgat	attgtcctta
12541	agatgacaca	tgaattttaa	atgcatagt	tttggattat	tcatgagagc	cccgaagaa
12601	cgatgtccca	gggggttttt	ccaggaacat	gcctgagatt	gtagataaga	atcaagcatc
12661	tggggctgcc	gcacaatgga	aaactccagc	actccatgga	acttttccat	ctgcagcagt
12721	cggaggatth	gcctgagaac	atacgcgga	tgaagacact	ctcagccctc	aagggcacc
12781	agtcagcgct	gtttaaggac	ggtttttctg	ttcacagcat	acttcatgat	tacagcttca
12841	ctccattgga	tacaactatg	tgagtatgtg	tgtatgagt	tgtgagtgtg	tgtatgagg
12901	tgtgtgtgtg	ggggggtagg	ggagtgccat	atcccccagc	agcacattaa	gaaataatcc
12961	aattacaatt	taaataacca	ttgtttcaac	actttctcta	agtgggtgaat	gtattcttca
13021	gtctcttgg	tgatctgaac	taatagaaac	caaggaaact	gttatcacat	accaaactcc
13081	caacttctca	acaccaagtt	gcaatttctc	taatactgaa	gcacacgtca	gttcagttct
13141	ataagctccc	atggagcaat	gatttcaata	aacacaattt	cataagcatc	ccacacgttc
13201	tcaagtttag	gccaattht	ctcttactca	actccatatt	acttttaaaa	tgcaggaata
13261	ttaaaacat	tatcaaggac	tccaaatagg	tcaatgtatt	atctgtgggt	ttaagaaaga
13321	aacctaaag	gagagtaatt	atthtgtcac	cattatthtag	cttaaaaata	ctthtaaatg
13381	tattgttcca	attattaggc	ttctccatat	aatttggaaa	ccattaaatg	agtttcaact
13441	tctttgtccg	tataactggg	tatatctgag	catagatgct	acagacatca	cgttgccatt
13501	ggtgcccata	aggcttcgta	tgcccacagg	gcatataatt	aagattcaca	aaagcatctg
13561	actggcatcc	cactctaccc	ccgactcaga	tccaaagtat	cctttcccag	gtactgtccc
13621	ctgtcaccat	ccttggccaa	attgagaatt	tatcccagg	tgttgaaatt	aattttgatt
13681	ttgattctag	tcagagtht	aaatgattth	ttagaagt	tgtcaatctc	acctataaga
13741	tactaaacag	catcacttat	ttttgtctta	atctgtcact	atthtatgaa	ttatthttta
13801	agaaaataca	gattacttct	taaagaaaga	tcataagtgg	cactataata	gcattcaatt
13861	gatagaaatt	gatgtagaag	cctgcattaa	taattthtcc	tgctgctthc	taaagtggc
13921	tttttagtht	cggttgagg	gggctthaat	tcagcatcac	ctcatttgat	gatttattta
13981	ctaattthatt	tccatcacaa	atggaatcag	aatgaagcg	aaggcaaaaa	atctthtgca
14041	caaattcatt	tatattthgca	tgagtatcac	caggctacct	gcggatgcaa	tgaagcccta
14101	taccctgtgc	tgaagtcagg	agcacaggac	actgggagtc	tgtctcagcg	cagtaactgc
14161	tacatggtac	gctccacatg	gtatcctctc	cacctgagcc	ctcctcatcc	ctcgccccct
14221	ctccacacct	cacctctctc	acactgtatt	atctcccact	gcaagcaacg	cagaggacac
14281	agagggtcag	ctgaagtga	ggcaggccag	ttctthtcca	attcactctt	atgaaaatgt
14341	gttaaattccc	gttaaattgca	ccgacctgaa	ctgaaaYgat	gatattcagta	aatttgtht
14401	tgtcatctga	tgcccacaca	gatctcagca	catgtthtgg	gaaaggctgc	agtgttcaag
14461	gagtactaga	aatgttctth	ctgagtggac	tggccatgat	aagccaaaga	atattatagc
14521	cgatagggat	aaatcatggt	tttcccactg	cgcggttgcc	tgggtggagat	tattccagcc
14581	tttatthtaca	gctacaaaaa	taatcctgcc	tcaaggattt	taggaagcaa	ccacctcctg
14641	cctaaagaac	tacactgcat	tgthgacttg	ccagctagaa	accagacatg	agtcgtgcag
14701	ggaagthccc	thtgaaacggc	thgaaattgt	gtcactagag	ggtgctaaat	gccccctcaa
14761	aaggccttht	gagagaatac	tagtgtgcct	aattcttgat	ttaaattcct	tgaattgaca
14821	ttatthtaca	aagtggctctc	atththtact	tgthtaaaat	aagatctaac	atthtataatg
14881	cagaaatggt	gtththththt	gaaaaattht	gattgtthcat	tattatagaa	cataaagaaa
14941	tacacgththt	aggagcaaac	atgaattaca	cagatctgaa	tataagatta	aaggcataaa
15001	tctggggggg	tgagatttht	ccatggaaat	tgtataattg	ththtatgcca	ctgttaatga
15061	ththtaagcc	tgaaaaattht	accacttht	aataattht	gattgtthcaa	tatgtthcca
15121	aatgtgagth	gcatcaaat	cggtaaatgt	agagtatgth	tgththtctct	gtacacaata
15181	ctgacgtcag	tgctagtgcc	tgcttaaat	cagacaccag	tagatccttht	tccagaacta
15241	agtgttatag	gaggaatatg	gattatactg	taatatatca	gatgtgaaaa	aagcctcacg
15301	gtccctthcct	ttctcaaaaa	aaacgtgtag	tattthtgaa	tatgcatgga	gtatagcact
15361	tctaaaaatg	gtactthtatg	tatatatgaa	gtaaaaatagg	ccttaaaact	taatatacag
15421	atthtctthga	aaataatctt	attatacatt	tacactgact	ththtggtcat	ccaaacatta
15481	tgactthtaag	caaaaagaaa	tataaccaat	thtgcaactt	tcctctthcct	gcctthtgctt
15541	ctactthtaaa	atatctgcag	tattthcctth	tctcgccgct	tccactthtg	ttcataatacc
15601	aagggaatYgt	gagggtcaatg	ggtgacagth	gtthtgtctgt	gtthcacggct	gtcggggcg
15661	gctgggtgtg	ggtaaggctc	tgaccgacat	ctgaagaggc	thcacccact	gcggtthtagg
15721	atacatththt	ctctcgctct	gccagtagaa	cagggaggct	agththtcaat	gtgtthtaca
15781	gaaggataat	taaggcagtg	tgthcacctgc	tcgtctgcta	ththtaaaag	gaaacaaaca
15841	taacctthtgc	atgtgagagg	cattgcaaac	tagatgggag	gaggcccga	ccctgtaaca
15901	gtcgtacatt	ccggtcccag	ctthcgctSgg	gtgcaactgc	agataaaaga	cgctggctcg
15961	acaaaaagcg	ccccgtggct	ctgcattgct	agcatgcaca	atacgaattg	ctaattgatga
16021	gctggctthtag	gtaggaaactg	aggacctga	gtgcagggct	aacctctgct	tcacaggagg
16081	ggtccactgg	cgcgcgctgg	aggcggggag	cctthcgat	atthtctccga	agggaagagt
16141	ccatgcagca	tcctgataac	agggaccttg	gctthcatccc	caactgctcg	gtgaccccg
16201	tgctcattht	aattcattht	tgccaatatt	cctththtcaa	tcaaccagta	actthtgagg
16261	thtgthtcaa	gaagaaatta	aatgcattht	gagatRgaag	gcagccatct	tcccggagcc
16321	ccagtgtgta	cactgggagg	ggaacccag	gattccctca	tgactgtgtc	agtgtggcc
16381	ctcaacaagc	acttactgaa	tgagtgaatg	aatgaatgaa	tgaatgaatg	aagccggcca
16441	cagagcccag	gagtatcagg	ggagagcaat	actggctgtg	tcagtggcta	gtccaggaga


```

16501 gcccttcaag agcccagagt tgcacttgaa cttgggactc ccctgggatg ggtgagggtc
16561 tctcaacagc agttgacagg aggggaactgg gacaggccca gccagtttca ttcagtccag
16621 ccagctgtgg ctccctcttta ggaatgtggc caggcccagc tgtggccaaa gcaccagcca
16681 gtccctcagt tctgaacaga acgtgcccag catcagtgcc ttcatttgtt tttaaactgc
16741 ctgctgacca tccacaaagt taagatgaca gctgggactt aagttgtgag gaaccagtgg
16801 ctcccccatac actctctctc acacacacgc acatgcacac acacagagac acacagacac
16861 acacacatgc acacacacag agacacacaa acacacatgc acacaaagac agacacatat
16921 aaacacacat atacacacat gcacacacat atatacacac agacacacag gcaaacacag
16981 acacacaatg gatggtatcg atatctatga acagatgaga gagagagaca gagcaggagg
17041 tcatctgctc cccaccctc ttctccccac tgtcaccacc tctctcccaa gtctagctgc
17101 aggccctgtg agctgtggaa gtggcttttt taagctgtct tcttagattg agtcattggg
17161 cagtgaggaa ggtaaatttt ctctaagaag cctcccaaat ctgtatctta tgggatttcc
17221 gtctcaataa ttgagctaata agtacctgta agcaagtggg tagtcaataa aaaaaaata
17281 ccggctgtaa gaacgaatga atgaatgagt ggatgagtgg atgagtatac atcctctatt
17341 ttgctggcat catgattatt ttacagcaga tttatctgga tttcaatata aaataagagc
17401 tcccatttgt atacaactta gtccttgtaa ttttccaaag taactctgat taaaattatt
17461 tccagccaaa ctatttaggc aactgggttg gtttcacacg tacttatcag aaaccattag
17521 aatggtatat tgattgcatt tctagacatt tgccatacca ccatggcaac tgtatttccc
17581 aagatggccc agtaggaWgt cccatcatgc ataaccttct ataaagtgac attgactttg
17641 cttccatcag aaagtgaggt ccacgttccc actccttgaa tctgagttgg gctgtgacta
17701 cagcagaagt tcagctatgt ggcttccaag gctaccttgg aaaggtgata gagcttccac
17761 ctgattttct tgggaacagc cactcttaaa cctcagccac catacgggga gaaagcccaa
17821 gccatgtgac gaggccattt gtaggtgttc cagtcatcag tcccagccca cagccagcat
17881 taacccccag aggtataaat gaagaaacca agatcactcc agccccaacc ggcacttgac
17941 tgcaaaccta taagagactc caagcaaata atatctatct cagcccaatc aagccctgga
18001 accatgagag attctaaata ataaagtgat cattgtgatt ttaagccact gagtcctgca
18061 gtgagttgtt atatagcaac cgggcatcgg cataccatca gaagattcct taagaagaaa
18121 cttttgcaac gttgctacag cagaaaatat tccttctgta tgatcattca tccattcatc
18181 aatcttgatt ggcattgcct atgtgctaag cattgtcggg cactggaggt gcagaaaaga
18241 agtgaagcag tattcagcca aacaaacaac ttgcatattg gatagagaga aaaatatgcc
18301 aaaattacaa cagtattttg acccaacaga aaggacataa gaagggaaca tcaacagttc
18361 cttcctattc ttttccaccc tttttctttc taggctcatt aaatgtagag gtgcctcagg
18421 gtcactttgc cccatgagag tagataccct cctctcccat ccctaacttt ggtcttccat
18481 ctatgcctga taccagcagc tcccagggt cctccatgct gttggcacc ccatccatt
18541 ctctggaaac atctcagccc atcaacctca gattactttc ccaaggagat gtgagaaaac
18601 ttcaattttc ccctttgtga cttgcagaga aataggggtg gtaaagtaga agcagaggga
18661 gaggggtggg attcattacc ttgagttact aaagagaaaa gctctagtgt ttagaagggtg
18721 ctgttattat tttctctgaa acattagctc ctagaaatca gaggctctgt ccctagcatg
18781 gtctctaagg ctccaggac gcccagggg cttccctcag tcaattttga ctctaattgag
18841 agccatctgg aaggctgcaa tgggtgggct ggctgatcac tggagggggc ttcgctgtgg
18901 gcacagggac gtgcacaggt tcacagagtg tgtctccgtt tctgggaacc atggtcctgt
18961 gtgctccttc cccaaagaaa gcaggagaaa gaaaaaccac agtcctgagt gggattctcc
19021 ccaaacatct aaaaagcttc tttaaagaag tcaagttatc ataattaaac tcacatatgg
19081 aatgcctata gacaacgtgt tgctcttcca atcccaggga gctaggacac ccaaaactca
19141 cctcccagac ggagctagga tttgagatac tggattccac attacttaaa gctgttcgag
19201 cttttcatca ggaatggaaa gcattaatgc gtctcacacg tcactctctg tttcatggaa
19261 ttcttacact gRggagctct ttttatttta ctatttttct ttaacagcca gaacactgag
19321 aagtttgcaa agaaattttt cagctgcctt tagtgacct taactcaaga ggttttgcct
19381 aatctgtaaa ttggagttga aaatatttca gtacttttgg agtggggagc ttttgtctt
19441 taaaagagtg gaacgacact aacaataggg ctatacatac cttgtgcttc tttgtcagtt
19501 actgcaaacc aaaaccagat gtgaagtatc agcggctacc tcgtagtgac ccatggaagt
19561 tgaggctaata ccatatcatt cttaataact caaaactgcc accttttaac cacctaattt
19621 ttttctcact taaaaatgca aaaaaaggaa ttgacagtac acattgaaat cgattttccc
19681 ctgaccactt acagattttc tcctataaga gccaggaata aaagctcact ccattatatac
19741 aagcagccat catctgagta tgcttttagtt taggtgatca tcacctttaa caaaccaaga
19801 tctggaagga agatttctga tctttaacaa accaagattt gaaaactaga tattcctgtc
19861 atgacctttt cccaacattc agtatgtgag ggattcactg gattattaga ctgcttgtaa
19921 atgtaagaaa acatagaagg tttagtgtga aggagtttagc aacctaacaa atgtttcccc
19981 ctgaattttc aataaccttc ctgaatttaa aggtaatgaa tataaatgaa gaacaaaatc
20041 aatagatata ggaatgattc acaacctccc aaatgaataa atcRatcatt ccacctaca
20101 tttgaacatt caatcaatat tttgtctatt tactaaatct aagaggaact actttaacat
20161 aaaactaaat atgaaattat ttccagcatt gaatattgtg ttttgcctta gagcaggcac
20221 aaagtggaaat gcctatgggt acaaagctag gcattgattg atgtttaata cctacaaata
20281 cagcaattac actgtcatgc tacacgagac ttcctattcc tacactgaaa ttagactgca
20341 catatgtagg gataaaaagat aagacacaat catatcatat ttcctcaaat ctaagacttt
20401 ggggtggaag atgtaaagca catcatgatt taaagtatca ctaggaaaga aaaaacaatt
20461 ctgccaatga aaattcaccg taatactttc taatcaatca attttaagat acatcccaat
20521 ttttaagcaa gaataaatgt gttaaaatta acacaaattg gtacacttgt gatacaWcag
20581 aagcactaaa atgtcacagc aatagaccac agggtttctc aacctgggca gcatcaacat
20641 tttgggttgg ttaattatct gttgtggggg ctgccctgtg catggcagga tgtttgctag
20701 cattcctggc ctctaccac tagatgccag taacacctcg cagactccaa ttatgacaac

```

20761	caaaactgtc	tttagacatg	gccaaactgtc	cctaaagggtg	caaccaaaaa	ctgtcccagt
20821	tgagaaccac	tggaaacagag	caattcgggtt	ttatcagcct	tgtaatatata	ttgtgtgtgt
20881	gcactgtgtg	catgacagac	tgtcagccta	atggaaggta	tattgtcaga	tgggatagat
20941	tgacctgaaa	aaatcacata	aaccaacagc	tggtagatat	acaagagtgt	gtcctgcccc
21001	tcctaaccce	cacaatgcaa	aagaacctgg	atgaccacga	gtcaccatca	caggagttta
21061	ctatccataa	gtgtaaacca	tccaagaaaa	gtgaaaacag	attaaagaaa	ataaaaaata
21121	ataaaccacc	acacaatatt	tgggcctagc	cagataacaa	caatgaaaaa	atgtaatat
21181	ttgaagtatt	ggcaagaatg	tggaggaaaa	agcattgaca	ttcgtgtata	atgggaataa
21241	aataatttat	cctttgtctc	cgcaattgat	attctagaaa	tctatTTTTT	agaaatactc
21301	acaatagaca	gttataagta	caaaggatgt	ctgctattac	actgctcagt	aacagtaaaa
21361	tatgaaaata	cactgtacgt	ccttcaatca	gatattgaat	aattatacta	cacagtatta
21421	agaatgagat	agatattaat	gtactgcata	gaaaatatct	aaagtataat	aagttttaga
21481	aaattatcac	atatgtatat	tagcatatgc	agagaaaaca	tcttaaaata	caaatttcag
21541	ttttgagggt	tggatcatgg	agtaactgcc	cccttttcaa	gtcaaacagt	tgagaaaatt
21601	taggataaaa	caagtgtgtg	ctacctttgt	aatcagataa	agtattttta	aataattcac
21661	attataatat	agaaatactg	aaatgccaa	aaaattttaa	tatattaatt	aaaacctacg
21721	ggccaggcgc	agtggctcac	gcctgtaatc	ccagcacttt	gggaggccga	ggcaggcgga
21781	tcatgagggt	aggagattga	gaccaccctg	ggcaacatgg	tgaaaccctg	tctctactaa
21841	aaatacaaaa	attagctggg	catgggtggcg	tgtgcctgta	atcccagcta	ctcaggaggc
21901	tgaggcagga	gaatcgcttg	aaccaggagg	tcggagggtg	ccgtgagcca	agatcatgcc
21961	actgcactcg	agcctgacaa	cagagtaaga	ctccgtctca	aaaaaaaaaa	taataataat
22021	aggctaccaa	ttagacttta	tagaatacat	aaatatatta	atatagctac	aaagagggtg
22081	aagcttattc	attgagacaa	gagtatttat	tgagcatcga	ccttatttaa	tacactgtta
22141	gtaagataac	aagtgaact	tgttaaaaaa	aaagaaacta	ggacaaaaga	aatttgagtt
22201	gagttcccca	aaaacaggga	atattcagat	tgtaggggaa	attgggttaa	ggatttggtt
22261	cagcatgaaa	ggagcaagga	gcaaagaaac	taaatgggag	gttatgctga	gaagtatatc
22321	agtatgagga	aatatcctga	catctacaga	caaataattg	ttgccaattc	attttgggca
22381	ttgaggattc	acaagaataa	ttaaaaacac	gtaatatata	atccttctga	ttagagcaca
22441	ttttatggca	ctgcataaag	agatggctgt	gggagtcatt	tatattttta	tactaacttg
22501	aacaaggcct	ggttctgcaa	ataaaacaga	agagtaaata	tgaagtggag	cacataataa
22561	tgttactggt	tctgtgggtg	agcttccata	ggaaagaggc	aaaggcatca	atctcaaaaa
22621	gttagaaaaa	cccaaagaaa	gaagaagaaa	aataacaaat	gagaacaaaa	ttgagaaaat
22681	tgtaaataat	atggtagaga	agataaacia	aaccaaatct	ggttctctga	aaagattagt
22741	tatgtgtaag	tactgggtga	ttacagagag	aaaagaggga	aggttaaaat	aaccaaagtc
22801	aacaataaaa	agggggctat	tactacagat	gctgtagaca	ttggaaggat	aatagaatat
22861	tatgatcaat	ttcctatcaa	taaatgtgaa	aaattagttg	aaatacataa	ttggaaaata
22921	taattttacca	aaactgtcaa	aagaaaaaac	acaaaacctg	aactcctata	attattaaag
22981	acattgattg	aaaaatctca	gacctcttaa	aggacaactc	caaaaataaa	aaaataaaaa
23041	aaagaagaaa	agttccaggc	cagacggatt	tatcagcaaa	ttctaactatg	catttaaaaa
23101	aaaaaggatg	ccactcttac	ataagctttt	cagataaaag	aaaagaaagc	ttgataccaa
23161	aatgtagcta	gaaaattatt	taaaaaggaa	aattatgggt	caatttcata	cataaacata
23221	gatgcaaaat	cctaaataaa	attctagaaa	acaaaaccca	acagtatata	cgacaataat
23281	atatatttgt	aacaaactgg	atttatttta	agaatgaaag	cttgtttcaa	tcaaataatc
23341	aaattttacat	tgtaaagaaa	atttatataa	ccttaaaaca	aagaagaaaa	gcacttaata
23401	acattcaaca	ttcatattaa	aaattcttag	taaattagaa	ataaagagga	agttttataa
23461	tcctacaaat	tgataaaagg	aatctaccga	aacctacagt	aaaccacaca	ttttcatgtc
23521	aaaactttta	aatttaatac	tttgaagttg	ggggaaaaga	caaagaagcc	ccacatatta
23581	ccgcatttgt	ctgaaattga	attggcagtc	ttagttagta	aagaaggcaa	ggaaatgaaa
23641	tgcaatgtta	aaggattggg	aaaaagtaaa	taaaacttta	tttacagatg	acatcatttt
23701	tttacacaga	atttccaaga	gaattttggaa	ataagtcatt	agaattaata	aatgagtttt
23761	aaaagtttgc	tagatacaag	gtcaatatag	aatttttagtt	ttatatatca	gcataaacat
23821	caatagaaat	caaaattttt	aagtgatact	gttttcatata	gcattaaaaa	taccttaca
23881	tatggacata	aatctaact	aatacgtgca	gaacctctac	acaaaaaact	acaaaatatt
23941	attaaaagaa	gaccaaata	aatggataga	tatattcatg	gattgaaaaa	cttaataatc
24001	aaaggtagaa	ttttcttcaa	attgatcaat	agattcaatg	cagatgcatt	caatatttca
24061	acaaagtttt	tgtgaaactt	gagtgattct	aaaatatgta	tggaaatgca	gagtcaaaaa
24121	cagacaagat	gctcttaaag	aagagtgaga	aatacaaaag	attatcagag	actattacaa
24181	actggaaaac	ctagaggaaa	tggatacatt	tctgaacaca	tacaacctgc	caagattgaa
24241	tcagaaagaa	actgaaaact	taaacagacc	aataacaagt	aataagattg	gataggaaaa
24301	aaaatctccc	aacaaagaaa	agtcaaggac	cagatgggtt	cactactaat	tctaccaaac
24361	ttagaaagaa	gaactaatac	caatcctcac	caagccattt	caaaaaatta	aagaggagag
24421	aattcttctt	aattcattct	atgaggccaa	cattaccctc	ataacaaaat	cagacaagaa
24481	cacaacaaaa	aagaaaacta	caggctgata	ttcctgatga	acatcacttc	agttcagcat
24541	ggatacaggc	caatatctct	ggtgaatata	agttttctag	tattttgttc	agcaaaaagct
24601	atcaacaaaa	tattagtagc	ctgaaaccaa	cagcacatca	aaaagataat	gcaccatggt
24661	caagtgggat	gtatcccaga	gatgcaagga	tgggtcaaca	tacacaaatc	aataaatatg
24721	atacatcaca	tcaatagaaa	aaaacaaaaa	ccatatgatc	atatcaataa	atgcagaaaa
24781	ggcatctgat	aaaacttaac	attgtttcat	agtaaaagct	ctcaacaaac	taggtacaga
24841	agaaacatac	ctcaatatat	taaagtccat	acatgattaa	cccacagcta	acattatact
24901	gaacggggaa	aggcggaag	tctctcctct	aagaactgga	acaagacaag	gattctcatt
24961	tttatcactt	ctattcaata	taggactgga	agtccttagcc	agagcaatca	ggcaagagaa


```

25021 agcaataaag gtcattccaaa ctggaaaaga agtcaaattg tccctctttg gagatgacat
25081 gatctttacat ctagaaaaaac ctacagactc caccaaaaaa ctcttaggtt taattaaaaa
25141 attcagtaaa gttgcaggat acaaaaaaat cagtagcatt tatataccca ataatgcact
25201 ggctgagaaa gaaatcaaga agaaaatccc atttacaata ggtataagga aaaaatatct
25261 aggaaaaaaa ttaaccaagg aagcgaaaaa tctctacaaa aaaactacaa aacactaatg
25321 aaagaaatgg aaaaggacac aaacaaatga aaagacactg catgggtcatg gatcagaaga
25381 actaatatca ttaaaatgac cacaccaccc aaataaatct acagattcaa tgcaatccct
25441 gttaaaatat taacgtcatt tttcacaaga atagaaaaaa acaatcctaa aatttatatg
25501 aaagcaaaaa ggagcctgaa tagctaaagg aaccctgaac aaaaacaaca aaactgggag
25561 catcacataa cctgacttca aaatatatta caaggctcta gtaacaaaaa gagcatgata
25621 ctagtataaa aacagacgca tagaccaatg gaacagaatt gataacccag aaataaatcc
25681 acatattcac agccaaccga ctttcaacaa aggcattcagt aacatacatt gggaaaaaga
25741 caccctcttc aataaatggg gctggaataa ttggatatcc atatgcgaaa gaataaaact
25801 ggacctctat ctcttgccat atataaaaaat caactcaagg tagatgaaag acttaaactt
25861 aagaccocaa attataaaac tattaaaaga aaatagagaa aacatttcag gacattgatc
25921 taagcaaaga tttgatggct aagacctcaa aagcacaggc aagagaaaac agacaaatga
25981 gactatatta aactaaaaca ctctcgcaca gcaaaggaaa gaaaacaacc agcagagtga
26041 agagacaacc tgttgaatgg gataaaatat ttgtaaactg ttcattctagt aagagaaaat
26101 ccagaatata caaaaaactc aaacaactca acaattaaaa agaaaacttt taciaagtgg
26161 gcaaagaacg tcaatagaca tttctcaaaa gaagacacag gaatggccat caagcatatg
26221 aaaaaaaata ctcaatatca ctaatcatca gggaaatgca aatcaaaacc acaatgagat
26281 atcatcatac cttagttaga atggcaatta ttaaaaagac aaaaaataac agatgctggc
26341 cagaatgcag agaaaaggga actcttctac actgtgagtg ggaatgtaaa ttagtacagc
26401 cactatagaa aacagtagag atttctcaaa aaactaaaaa taagactcaa tataatccag
26461 atatctcact actgggtatt tatctaataa aaaagaaatc agtatatcaa aaagatactt
26521 gcaccacat gtttaccgca gcactattta ccatagcaaa gacatgaaat caacctaat
26581 gtccatccac agatgaaatg gtaaacaaaa tgtggtacat atacacaatg gaatactatt
26641 tggccataaa aataaggaaa tcatgtcact tgcagcaaca tggatggaac cggagggtcat
26701 tatgtcaagt aaaataagcc aagcacaaag gacaaatacc acatgttctc actcctatgt
26761 gggagctaaa aatgttaatg tcatggagat agagagtggg atgatgggta ccagaggctg
26821 agcagagagt gggagtggag aggaagagag tttggataat ggggtacaaac atacagttag
26881 atagaaggaa taagtcttga tgttgtagag cagagttagct gactatactt aacaaaaatg
26941 tattgtatag ttcaaatacag ctagaaaaga ggacttgcaa tgttcctgac acatagaaat
27001 gagaaatacc caagggtgaca gacaccccaa aaccctgact tgatcattac acattctatg
27061 catgtaacaa actatcacat gtaccccata actatgtgtg tgtgtgtatc tatctatcta
27121 tctatctatc tatctatcta tctatctatc tatctatcta tttatagtat ccatttttaa
27181 aaggcaaatc ttaaaaaaaa gagtgaggta ggacaacctg ctctactaaa catttttata
27241 aaggcacagc aattaggtca gaatagtgtt catgcaggta gaaacaaatc agacaatgga
27301 aaagaaagga aagttcagaa acagattcac acatatatgg acacacttga tttttgacga
27361 aggtggcagt tgattttttt ttacaaaggg gcagagttagt taaaaaaggg agaaactgtt
27421 ggtaaataat gctggaaaat gagaaatcca catgagaaac agaaacttga gaagtaactc
27481 ataacatcac aaaaattgat gtcagataaa ctataaatct aaatatgaca agcaaaaact
27541 atgaagtttc tggaacataa tatagaaaac tatattcctg acttgggaag ggaaagattt
27601 taaaaacaag gcacagaaac actaagagta aaggaaagac taataaattg aactgcatta
27661 aaataagaaa aaaattagga acttaaat tcatcaaaag acactattaa gagaatcaaa
27721 aggcaatgca tggagtggaa gatgatattc ttaacacatc taatctacta ttcatatcca
27781 gaatatgtaa agaaccoccc tcaatcaata agaatacaca caagtcagaa tacacacaag
27841 gaaaaacagg gaagaaactg cacaggcagt cataaaagag gatatccaac tgctcattaa
27901 aaggctctct acttcattag taaagcagga agtacaaatt aaaacctgaa tgaaataaca
27961 ccacagatac atcagaatgt ctaaaacaaa gactaacaat gttgggtgaag atgtggagca
28021 ataagaactc tcacacacag ctggagttaa Raaaacatcc ttatttatcc atcagggtg
28081 taataagagg catatagcat attcaaatag gtaagtgaac aaaatttaat gaaagaattt
28141 acaacggtaa aggtagaatt tagtaaaaac caaagggtga ggaagtcccc caggctagca
28201 agaacaggaa gccattacta ccctcaggcc tacaagggca agggaggtag cagtcacgca
28261 gcaccggtag ctgtgaacac aggagaggat aaacaatagg agctgtggcc ttccatggag
28321 ggaaaaagtc actgccaaac catgaccaa gagagaaagc tggagaaaaa aactcccaa
28381 gctctctcct cctactctca ggcttccttg tggtgactct catttgctta acccaacaga
28441 agatagagga caaaggagcc catttgatgt agtcgacaga agtcaaactc ccaggacaag
28501 aggagcagag aaggatggag aatgaattag agaagtaaac aaagaaagtc ggcacatcta
28561 ctgtcatcaa agactgtgta attccactat ttaatacatg tacaatagag atgtgtgtat
28621 atgtgcacca gaagtcacct acaagaatgt ccactgcagt attattctct cagttaaatg
28681 ctatatctgg ctgcacaact agattaggac tgagacccta accacacatg tagaagcagg
28741 gagaaagatg cagttgagaa gccctttgcc atctgatatg cttccaaaca agggaaactc
28801 agcttggaac ctgaaagcat tttgtataaa atactgtttg tatgatattc ccatgtcacc
28861 acacacacac acatacagac acacacacat acacacacac acaacaaaaa caaaaaaac
28921 ttccagggtt acttttctcc tcagttagca ggtcaaaact tttcacgtgt gaaatacttt
28981 tgcaaggagg cagatgaaac gggggagaag ggataacctt gccttgagct catctatcaa
29041 ttcactgcaa ggaaggaaca cagagcttag atatgaagca tcaggagtcc ttccaagac
29101 ccttcttgct ccttgggaag agccaggagc tggaggggat ggccttcact gagaagtggc
29161 atcaaattag aacctgcaca acaaatagga accagctact taaagatcca gagaagtagc
29221 cctctagact gaaggatcag ctctcaaat atcctttttg attttgaact cacaagttca

```



```

29281  ggggcatccg aggaacagac acaagccagg gctgaacaat ctcatctgtg tccatgaggt
29341  gggcaagagc cagatcctac tgaggagttt gaacttaatc ccaaacatgg cgggaagcca
29401  ttggggccaa agatgaatta gggattgtct gatctccttg acacgttctg aaggttttgt
29461  gtacaRaaaa ggtttgtcaa catgcacaaa ggaaagctgg gataaccaag ctaagacgct
29521  accgcatcaY tctaggggac gggtgactca ttccaggagt ttctgcagga agacctatca
29581  ggactggtga ttgactggag gcagagagca cgaaaaaaga acaatcagag atgatctgtg
29641  gtttgtggtt gttgtgtaat gttaaggctt aacaactgcg aaaatagtgt ttttacttta
29701  cagagaagaa gacttgaaga atacaagatt ggggagagca gatcgggatt tgtactttat
29761  atcagacgtg ctcatagata tacatgttga gatatcagtt gggagctgga tatatcagga
29821  ttcgagactg ggaatcacca gtttatagat ggtttttaag ccatgtgatt ggatctcatt
29881  tcttagtggg gagaagtga atacaataa aaagccaaga ttaaagctga accttcagcc
29941  tgcccatcac ttagaagccc agcagggaca gaagagccag ccgacaRcac agagtcgagg
30001  aggaggattt cYgggcttca gtgagtgtgc atcagagatt catggacaca acttaaagta
30061  agaccagcca cacagttccc ttcattttct caagcaacat tcagcatctc aaagtgcggc
30121  tactacacac ggagccaagc cctgggtccag ttatcacaaa acctactag atatgtcgat
30181  tattagctgc attttatagc taaaggtagg caggcacaga gaagttacgt ctcttgocca
30241  cagtcacagc aagcaaacag acctcagacc aaagtcttct taactcctta tttcacatct
30301  aaaacactat gtgacgccac cKccaaaaaa tgtggggggtt actctaggac aaaagaagct
30361  catgaaagca aagagagaag catagagctt aaatttagaa caatattcag ggtgattggg
30421  aaaaatagcc tccatacaaa tataatcggg tcatcaccag gtgaataaaa tgagagagga
30481  acctggtaca agtgaagttc attgaatttg cttgcaaaaa aacataattc aagtgtggaa
30541  gtttggaaac taaaatagta atcagctaaa gaaattttca ggccaactta gacacaatgg
30601  tgacaaagct cccctgagga gacaggaact atactacttg caactctaac tgaatggact
30661  taacttagca attaagatca ccgtaagttt gatcagataa gtattaaagg gtgtcttggg
30721  tacatttgca gattcagaca ctcttagttg tgaaattctt caccaaaaat ttgcaactta
30781  tggcttgca attaaaaaca tgatatgaat gaaattcaga tatctcttgg taaattttat
30841  aattattcct cccatcagct aaagtctctc gtatgaaggg ttataactga tgtcatatac
30901  aataactaca agctgtatca tacaataatt gagaattttc tattatagaa agagttgctt
30961  taatctaaac cttaaagtagc atcaataatt ttctgtaagt ggtccccttc ctatgagtaa
31021  gccccagga aaaataaatt gctttttaaga aatgctgtaa gtaagctgtt tcatatataa
31081  gttttgacaa gatctggcta cttaaattac aagatataaa atgagatttg tactttttct
31141  caaatgtaaa aaaaaagatt tacttctgaa ataatggtct ttataaaata tgcatttttg
31201  ttcttttttc ttatcatatc tataaattta ctaataaaag attctatctt gatttactaa
31261  catttgaaaa gattgattat attggtattg caagaagagg ataccataaa ttaaaaatcc
31321  atatatatac catattcttt tatttgcaat atgacaaatg attgtgtaaa gttataatca
31381  ataaaagcta tttgaaagtc ataaaatgga tattgccata actgctttcc tagcaagggt
31441  aaaacacttt aactattttt aatcaactta cagtgtagta gatcaagcat atctaaatat
31501  tttattttta tcaagcaaat atatttctgc tgttcctatg acagtatgaa agtttggttc
31561  aaaatatttc caaggtattt aacacagttc agtagaggtc ctgtctcata aatcaatttc
31621  agattagata aaaggaaaaa gcaaattctt gtttacttca gaatttttca agccagttcc
31681  aaagacagag ttgttactct catgtgaatt ttcagtagaa agctgaacaa cgacgttgct
31741  ctgacaatct ttttaaatac catatgatgg agacagaata acaaaaacaa agtaggtata
31801  agctgtacga aattatttct cttggacata aaatatgttt ggggaagaaa tgcattgttc
31861  catatggact agggtagtta cttctcaaag tgggagcaac tcagactctg aaaaatgggt
31921  tctcaaagga ggcatttgtt ctgggtgagg ccagttttct agtcaaaatc attttattaa
31981  atgccattgg attgaatgct tccaggtttg ctctctgaaa tatgccctat cattcttaaa
32041  aaacacactt aggtagcaaa aagggcacac taaaaataac gtgggttaat gtttctatcc
32101  tgcctgtgtt ttctaagtag cccctgcctg agctttcgac ttttttaaat gaaccatcaa
32161  atagtgtgtt gtctatcaca aataagccat ctattttgtt attcctgtaa cttttYgtag
32221  aatccagaaa gtaacattct tgctgatata tcttatataa caccaagtcc attttccaaa
32281  tgaggattcc aatgagtatt catcaccaac atctccccga aaaatattta gaaaaaacag
32341  actcaatcct ttatccaaag tcagtgaagta agaggcgggg gccagggttg gacaaaaatc
32401  tctttggcca ggaagccggg ggtcaccttg atctacttct ctaagctccc accctgatg
32461  aatgttcaat atctgagttt caccctactc attattgtaa ttctccgtaa aaccYagtt
32521  acccacacgg aattctcatc tacRtctagc ccaatttgct actggatttc aatgttattt
32581  catatgaaaa caatcactaa cagaaagaac ctggatctgg tttcgaaaac ataatttgaa
32641  aggaattcat tctgaaggct gcaaaagccc agtgatggcc catcgggtacc ctgaatgggc
32701  ttctcaggtg cctccactct cctccgtatg tctccatcca tctcaRaata catgtctggc
32761  tcttcctgct cataaacaga aacagagagt tccgggatcc aaaggcaaga ctgcgattta
32821  agagacactt tgtttttgta ggtgttcaag gatttggaa caaagcagca gaattattaa
32881  aattaatcca attttcttgc atttattttg ttagttcata cctctaaaag atatattttg
32941  gaaggcaccc ttcaaccac ccatttataa atcaaagctt tctttggaat ccctgagacc
33001  aaaccaagc tagacagtga cactctgcca gctccagagc cctgcccacc tgggaaggggt
33061  atggaatgca ctatttgact tgagctcaca tttaattaca gtgtcaaaaa tcaaacttaa
33121  attgctttta tcagctKcca acactatgag cctttctggc ttgaatttct ataaacaaag
33181  aataaattca aatctgtcac aaagtggcag caacttggtg accactggac taggaatcgt
33241  tatgcaacca tggctcactg tggaaaaagt caacatcttc ctatatgtga ctctttctg
33301  atcttttctg actattagtc aacagaatca tcataaagct aaattatcta tctgactga
33361  aattactcag cctcagacat ccaaaccagt agctgttcac caatgaaacc tgaataaagc
33421  tgttgctgac tttccctgct tcaatttaga gtatttttgg aaacatcatt gcatgtttaa
33481  aatataataa gcaaaaggac ctttggtaat taaacattct gtaatttaaa actccaaRag

```

```

33541 acaggagcag tgataagata ttagattttc tttactgggg tgaaaaagac agaaagtggg
33601 taactgttta aaaaaagaaa gaaagaaaga aatccaagga ttttttagagc cagaaacagt
33661 aacagtgtcc tttattctgg aaatgtttta aagcctgtaa gcagagatca cccagttcat
33721 cctgagcatt ggtgagcaaa taacttctga aatgctcttg aaagagaatt ctccagcctt
33781 ctctgtttga aatacttYct aMagcaaaca caaaagtggg caaaacacaa gagctcatgt
33841 taattccaaa caaagagacc aacagtgcga aattgagagt ccatcttaga agcgggtgct
33901 gcttccacat caagcaacta ttggaaagag taggggtaga tgcagaatta agatcatttg
33961 tgaYtacaga aagagacaag aaaatttaatt tttaaaacta aaagagaaat ttatttcaga
34021 taatccaagg aaatgagcag agtcaaccta acaggattct caagcccctc cctactgggtg
34081 tgggtgtgaag atcacacgtg gtgtagctga caccctcac atcttccccg cRccctcct
34141 gccacctctt tttggcattc accctctctc ggggtctgtg tccctgccc a tgttctccat
34201 gaaaggccaY gttaatgccc atgctctttc ctgcctctaa cagacgatgc cttccacagt
34261 cactcaagct ttaacctctc tctggattcg gacctgtaca tccaaaagcc tgccagRcat
34321 ctcttccaga tgctctcaga gcacatgacc agaagcacgc gcaaagctct cctgagcctc
34381 agtgctttcc ctccaacact tcttccactc tctcagttac cgagccaaga cacagagtgtg
34441 cttgtgagtc atttctctac ctcatcccc acccaacctt cctgcgagat cctgctcaYg
34501 ttacctccta aatgctgtta cgtgacttca accacgtcag ctttttatgg gggaggagag
34561 gcacctgcat atctgtggga gcaccaacct ctagacatct cctgccaaagt tactgcaatg
34621 tgcagaaaag aggaagaaaag caagcccaag tgcgaaagtc tttgccagtc cttctaccaa
34681 ccacaccttc ggtggagatg tgggtctgtg gaaatgcaga gacggactga aagccaaatg
34741 ggccaatgag agMtctgaac aaaacattaa gcttggtttt ctttaaggca atacgattaa
34801 cagtgggtcca ttaagaatcc gtttaaaaaa aataataata atacYttttc tgactattgt
34861 tggggaagaa taactccttt atggggagta tgaactcaaa gacatgatat tgtaaaggag
34921 gccttgaaga agagaggggac taagaaatgt gatggcgtgg tctgttacat gtgcaggtgc
34981 tgtgtgtgag ggaagcactg aggaccactg gaggatgagg gatgctctgt ccttctcggg
35041 tatggctgaa ggacagggat tgcccatcaa ggagtaaata atccatgagt ggactaaatt
35101 ctttagaaac aggaactcaa atccagtagg gattaggata aaaatgtaaa ctctaatttg
35161 cacctctccc tctctccctc aagtagtccg tttctataat tttatactaa atcaattaaa
35221 tgtatctgct ataataattaa tcataatttt gtctgaagta gtaacaactg gaaactacct
35281 aaaagagtca gagcaggact gtaagactat attgtagtct acactatgtc acagYggact
35341 gcatcatgat agagaacgat actcatgatt taactgataa acacatatgg caatgaataa
35401 aactgtgagt aagatgtctt taatttttagc aaaattatct tcatttctaat tttcaagtaa
35461 acttaaagat ttatatataa atgcacataa ttttaattaaa atacatgcat atattaacta
35521 gaaggcta at ccccaaaat gtccatagat gttatttctg agtgaggagg gtcaggaagg
35581 ttttaatttt ctttgtacta actctattta ctaaaatgtc cacctggatt aacgttataa
35641 taaaaatgtt accgtttaaa ataaaatgaa taaaatacac cggtatgaag gtattattag
35701 aacatacgaa agtacaaaat caagcagcaa aaggaggaaa ttatattaag aactgaaaaa
35761 actatgttga gaattctgtc taagaaacgc tgtagcaatt aagaaaaatc ccagttctgc
35821 aagtaatggg agaaagatga tgacttccag aactttcacc atctactaag atgttcacca
35881 attcctaaga agggactgaa tacgtctgca tcctcagatc tgagagtaat tttccacgac
35941 gcatactgag caccataatg agtgaagtct ctgagatgac ctctctgacc tctctaaaac
36001 aatcaggcac tgcaaacatg gcctatccca cactagccct tgggtgaaat caagggcata
36061 atattagact gaaacagtga gaagaagatt cgacatggag tgcggcaaga atgtgttcta
36121 gtccttgaag gccagcgtc tccaagtgt ggtctcagac cagcagcctc agctgcagct
36181 gggggccttg aaatggaaac gtatgtgcta cgtcctggac ctgtggaatc agaatctctg
36241 aggtggacca ggaatctgtg tttttaa aac cctgtggttg gtaacttctc gctggctgag
36301 gacagagaga atgcttagtg aacgctgagg aatgacgggt taaataatcc ctgaatgatt
36361 cctgagcgga tcaatttctc agccagagtt ttgaccgag ctgatgatga acagggctgt
36421 gaYcaccagg aagggtctga agaggaggcR ttgattgcag ttttctgcct ctgatcctca
36481 Kgcattggagc cccaccccc aactctctta cacggaggcc aaagaaaaag ctggaattct
36541 ccaggagagc aggacctgtt aaacagcaaa gggcaacc aatttgatg agtggccttg
36601 ccctgagaag ctttgaagcc agaggttact gaacaactac cctggttaaa accctaacgt
36661 gacaatgata acatgtgact gtatgtggct gtcttcaaaa cagcaatgat ttaggcacaa
36721 ctgtggatct cagattgttc cgtgagtttg gtctgataag attgtatgcg tttcccaggg
36781 gtgccataac aaagtgccac accctgggag gcttccgcca ccgaaatgta tttctcaca
36841 gctctgaggt cgaaagtcca agatcaaggt gtcagcaggg ctggttcctt ttgaggctgt
36901 gagggaggat ctgttctagg ctctctctcc cccagcttct gggggctgct gcagtctttg
36961 gtgttccttg gcttatagaa gcatcatccc aatctctgct tttgcgttca catggccttc
37021 tctcatata cctgtctgtc tccaaatttc ctcttctcat aaggacacca agcactggat
37081 taggggcccc ccctactaca tctgcaataa ccctatttcc aaataaggte acattttgag
37141 ggaccagcta aatacaaaaac attagccagg catgggtggg ggcacctgta gttccagcta
37201 ctcaggagaa tcacttgaac ctggattaga acttcacaat tactgacacg attcaacca
37261 tattaggttg tttagtatta tacattagga agccatagca aacttttttt tttttttttt
37321 tttttttttt tttttgagac ggagtctcgc tctgtcgcct aggctggagt gcagtggcgg
37381 gatctcggct cactgcaagc tccgcctccc gggttcacgc cattctcctg cctcagcctc
37441 ccaagtagct gggactacag gcacccgcca ctacgcccgg ctaatttttt tgtattttta
37501 gtagagacgg ggtttcacct tgtagccag gatggtctcg atctcctgac ctcatgatcc
37561 acccgccctc gcctcccaaa gtgctgggat tacaggcgtg agccaccgag cccggcccat
37621 agcaaaacttt tgtaaacata actattttat aaaatttggg ataattaata tttaaatatc
37681 ctttctggca agatttagcc agttttttta gcttcattga gagaaccaca atattagcat
37741 taataataga atgggtctatt aattttttta aaagatacta tgtctgcatt tccaatataa

```



```

37801 aattcacagc aatgattcag gtagaaatta aatgaggatg tcattgtcaa ccttttaaata
37861 tatattacag gagcagggag cacacgggcc ctgaggtaga aatgaataag gaatattcta
37921 gaaccaccaa gaagccagtg tggccacagc agagttagcc agtgggtgctg gaggcaggtg
37981 agatcttgaa gggccttggc aacatgaaca ggagcttgga ttttatccac attgccgagg
38041 gaagtatgag gtgggtgttta gcagggcata aatctcatct gatctgtact ttgaggaaaa
38101 cactctgact tctgtgtgga gaacagtcta taggaagcca agaggagagg caggagatg
38161 agggaggggt gacttcagtc tccaggagaa tgagctagtg atgtgaatta aggtgctggt
38221 ggtggaggaa gtgaggtgga gaactggaca ctgggatcta ttttgaagag ggagcctaca
38281 gaacttggtg gtggatggct atgagggaaa gaggattaaa gaatgatgct aggcatttgg
38341 gcttaaacia acccctgagt aaatggttat cctattatta atactaagat gggtaatgct
38401 aggggaaggag tagccttggg gagcagtgat gagttatttt cttagaSaga agccacgtta
38461 cctataggag gctcaacaga gtatcaaatt agaataaaat atctaattgt ctgatttgtg
38521 tctttatttt ttccattaag atacacatgg ctggccaggc gcggtggctc atgcctgtaa
38581 tcccagcact ttgggaggct gaggcaggcc gatcacctga ggtcaggagt ttgagaccag
38641 cctggccaac gtgggtgttac cccgtctgta ttaaaaatac aaaatattag ccaggcatgg
38701 tgggtgggcac ctgtagtctc agctactcag gaggctgagg taggagaatc acttgaacct
38761 aggaggcaga agttgcagtg aacYgagatc acgccattgc actccagcct gggtgacaag
38821 agcgaaactc cgtctcaaaa ataaaaataa acaaaaacca tgggaaagaa caattgagga
38881 aactggggac ttgtcctgga acagaagaca cgaggacttt tggtttttta gttttgtttt
38941 tgtttttgag acagagtctt gctctgttgc ctgagctgga gtgcaatggt gcgaactcag
39001 ctactgcaa cctccgcctc ctgtattcaa gtgattctcc cacttttgcc tctgagtag
39061 ctgagactat aggcgcacac caccatgccc agctaatttt tgcattttta gtagagagag
39121 ggtttcatcg tgttgccag gctgtcctca aactcctgac ctcaagtgat ccaccgcct
39181 cggcctccca aagtgccggg attgcagaag tgagccactg cgtccagcaa gaatgaggtt
39241 tgaagggagg catgattgtg ttctcttcaa atagttagaa ggttccattt gaaaaaggga
39301 tttacttatt cctatggttc tagtaagtgt cagaggggtg atctaagacc attgggtgaa
39361 ctttacagag aggcagaaa gccttcWcca ggggaagaaa gtcaagaaaa ggtctcaaaa
39421 ctgtctggca gaattctgca caggagagtc ctcaattYgg tgtagaattg gcaagtataa
39481 taactgtaaa tccctctcaa tctaccatct acatcattag gcgacatctt catttctga
39541 aaattccaac acatgaaggc tcacttacta tcaagatgag caagtttgtg ctacatagtg
39601 aatttgattt caataggact cattttatac cttttaagag tctttaaaac gttgaaaatg
39661 taaagatctg caagagcaac tgatcttcaa agtcccgtcg agtcacagga ttttgtaatg
39721 atgtctaaag aggaaaattc ccatttcaga aaaggctcaa tagtatttaa tagttagctc
39781 aaaaggacga ataaagtctt acatgggaag ctgctgaact aSagtcaggc caaaccttca
39841 tactcggaga agatgactgg gcctgtagac acagatattg atgataaatc atcaciaaac
39901 acagctttcc ttaattgggg tgggtgggcag ggagagcagg cttcagggtg gccttcctcc
39961 agcaagggca cacacacaaa ggggacctga acacgtggag cttatgggtc ggaagcctga
40021 agtgcctgac ccagcacatc tgggtgactag tagtgtagat tccccacaga agaatgaca
40081 aggcgtcatt attcaaagtg accttccttc cattggaata atcagaaaaa gctcaciaat
40141 aaagtaatct gtaagatgct tcatcttctc taggtaacct cccccacaa tgatgacatc
40201 acttcacatg aggcgacatg gttttgtgag gacttttctt tcttccaag tttggaatct
40261 ggctgaaggc taaaatcacc atttacagtg tttgagccct ccttSacact ttgaagaagg
40321 gtctgtgtaa atagccattc ctacttctca gactcgccag aggcaaaacc tgttttgctt
40381 tggtagtaca cgctcttctt taactggtaa aagactttta aaaaaataa gatgccattt
40441 ttaattgttt cataaatctg gcttagatat attaaaggaa ttgctatttt atatgtagaa
40501 cagcggcaag caaatctcaa gagattaaaa atcatgttct tgtggttttt ttttagaagc
40561 tgcaaatttg aattcaattt aaaaaatcat ggcacaggga caaaataaga atgaacaaag
40621 atgggaaaaa tgtccgcagc attctgcaga gtcaagcgct gctgtgagtg agtgtgcatg
40681 tttccaatta cacatcaggg ctggcgagc tccaggagtc aaattcagac agaaccacag
40741 tgcagtgcgt tacacagaac ccaggccagg aaaagcttca cagagtcttt ctttcaactg
40801 aggcaattgt gtagacaatt tggttcattt caagaaaaaa ataaaactga cagaagaaag
40861 aaaaatatYa ttatattttg cctctcaaaa caaagtcaa ttgtgttggg gtataaatca
40921 agattYagta tttccttggc tgcttcacaga ataatagtag atcaciaaga gaataagaac
40981 aagaaagttc agttctcagc cagacgatcY aaggtaacaa aggtgagac cctcattccg
41041 ttactcacag gagcaaacag acaaccaata ataattgggc acatgggggt ttcaacaaga
41101 taaactgtta tgtgagtcca ggggtgctaat ttcYggattc ttttgagttg caaggaaaat
41161 atataccgat tccccacccc caccaccca cataacaaga cacaatagtt aacagctgga
41221 agactgtggt tagggggaaa tgtgattgta ggcttccatt tcaaatgatg gaaaatcatt
41281 tctgaagtca ctacgaaagt tacttcacaa aactaaaaga agccttgaca ccttgtgtta
41341 tcccatcatc taaagcaatt ctagtttgga aacacttgat tcttggcagg ggattctaaa
41401 gaaggtgccg tatgtgaaag gctgggtgtg cagaaggagc ttttaaggaa tggaatgaga
41461 acagccaaaa gctaagattt ctgattataa tcacaggtct ggatgtgttc aaggtaaaaa
41521 gagatcatcc ccatcatttg caatattttc aagagaatgg ggcttttagt acactgatca
41581 aagtctgaca tggatttttc gctgccttcc aactccacat acctgcaatt caatgatctc
41641 tatggatagt agaagtaact gccaccctga tgttctcatc ggtgatttat acgtgaagtg
41701 gactcaaaag aaatacaacg aaatccctta ataaaaatta tgtccattga cccaacaagc
41761 tcccagtgct tgtatcagtt ctcaaccgat ttttagagaca tttgggtcaa aatgatctac
41821 ttgtaataag ccactctgagg gcactagctc tttttcacct ctgtgttctt tgaagcagga
41881 agtcagtaaa atcactattg aattaaaatg aagtaaagca ctttgagatt tcagatttct
41941 aaattaagga acacacaaca tacggtaact tatttgcaca agaRttatta gaaccaggg
42001 ctaacaccca aatgaggtca caggtaaagt aaaatctgtc tcagttattt gaactcaggt

```



```

42061 caacacacag acagagcaaa gcaccagctg acctctgatg cacaacccag tgttcttacc
42121 atagaattcc agaaggcatc tcagtcattc tcttatgtaa atacaaagac gWcaactggt
42181 ttaaaaattc attttattttt atttttagctt ctttgtgtca aactcaaaga agcctcacat
42241 aaatgatcaa agacttttttg gtggatcttc caaacgtaca tgccgggaag gcctgcttgc
42301 actttttcct tcaatcctctt aaaatgaagg ttttgaagat gcttgccaat ggaacgttgt
42361 gccttacagc tataatatatt tttaaaaggc attcagttta aattaatata tttggccaga
42421 caactgtatt aaaattcttg ttgttttttc tgttataatg gtagcctgtg gtatgactag
42481 tcttcttcaa aaatatgtac agttattgct tctctcttgc ctgggggtata tcatgtgttt
42541 ttcatttgag tgtacattgc aatacctcat taaaaccaac acttaggcta cacaaaagtc
42601 ttcatatcat gccgcaaagg gcgtaaacta acgtggaaag tttcagagcc tcataactca
42661 ttgcatatac ctcttataact agctgctcaa ctgatattta gctctcctgg atgatgtcac
42721 agtttttatc ctcttaaaat agcctgcctt caKaaaatat atagtttcct tcatgcacta
42781 atcatgggga gttacgatgt aaatagagcc attttttttc ttatacaagg aacaagtgtc
42841 ctcaccctcc tcccttctct cccctcccat acacagaagc acacttact tcaactatac
42901 taaacacttc acttatactt acactgcaac aaagagttgc aaatacatgc aaataaagcc
42961 tttataactc cctctctctc tgctggacag ctcttgact caagtatttc Ygaagacaga
43021 cactctgata agggctctgct ctgagcttca ttctcagcat acagtcctgg gattattttac
43081 ctaccaatat tcacctctgc atgaaccagt aagtcattac tgacaagaaa aaaacaattt
43141 gtgattttttt ttaatgtcac aatttttctt tttaaRgttt gggagagaaa gttgttttga
43201 atgtttctac agtttctatt gccaaatgaa cacctgtttc agagtccctg aaagtccacac
43261 atcagaagct tctgacttca acatatagtc tgctttgaag aattatttta aaaaagcatK
43321 gactgcttga agataagcaa gtgacactca atagcttcat tctttagtct tagaaaataa
43381 Wtttttact tccacacctat taggatggct actatgaaat ataaaaaaaa ttaaaaaataa
43441 caatgggtggc aaaaatatga agaaattaga acccttgtgc actgctgggtg ggaatatcaa
43501 atgatacagc ctctatggaa aacagtatgg tggctcctca aaaaattaaa aatagaatta
43561 ccatatgatc cagcaattct acttctgggt atatattcaa aaaaatttaa agcaggatct
43621 caaagagttc tttgtacagc catgttcatg gcagcattac tcacaatagc caaaaggcca
43681 aagcaacca atcgtccatc cacagatgaa tgaataaaca aaatgtggca tacaataaaa
43741 tgtcattcag tctttaaaaa gaagaaaatt tggacacatt gtacaatata gatgaatctt
43801 tttttaaatt aaagtgggtt ttttaatcgt tttattttta agttccgagg gacatgtgca
43861 ggatgtgcag gtgtgttaca taggtaaacg tgtgccatgg tggtttgctg cacctatcaa
43921 cccatcacct aggtattaag cccagtatgt attagctatt ttccctaagg ctctcccacc
43981 cccaccatcc cccaacatac accatagatg aatcttaagg acattatgct gcgtgaaata
44041 aaccagtcac aaaaagacaa acagtgtatg attctactta tgtgaggtac ctagagtagt
44101 ccaagttcag aaagtagtaa taatgggtgc caaaagggtg gRgcagtcag aacacgggga
44161 gtgttgattg acatcaagtt tctgttttgc aaggtaaaga agttccagag atttgctgca
44221 ccaacaatgt gaatatactt aacactactg aactgtaaag tggttgtgac tacagatttt
44281 atgttttatg tgtttgccac aaccaaaaat aaagattaaa ttaaaaaata aaagatttta
44341 tagcacctat cacttaccaa acccactgta catcttacac tRtgaatat tttatgattt
44401 tcaaaacacc tttatttttt tcccttattt gttcattcct tcatgtataa cccacaatgt
44461 gttagggttat gtgctgggca gcctggaaga ccaaagacg aattagggaa gtaccctata
44521 tttaaagcct tgcaaggaca taaatatcag taatataaag taaaatatgt tcaactgctga
44581 aaactgctat acttcctaga tttttcaatt caattgcaat ttctaataat ttgccatgtt
44641 gatcccacaa attcacttgt gtttaaaagt taacgtgctt gattatcata cagctgcttc
44701 tttcataaga ggaatacaga taaaaYgcta tgggatttca gggggagaaa gaacttctta
44761 ttaaatctcat attttcaacc aataagaaaa cacaattttt tttaatcaac actatcttct
44821 tgggtgctttt ttcacatctc atcctctttc ctcttttacc ctgcctaagc aaccatttct
44881 ggaccaatc ttgggttatt acatctgacg gcaagtgtta tgtgggccaat ggaccatgag
44941 caattagccc cctctctact cctagggatg gagtacatgt gatgatttcc atcagactca
45001 gattaaatat cttgctggta agttaccctt aaaaatcgat taatggactc tccaggtaga
45061 cactgaggta atctccaacc aaacctRact tatacttagg ggctttggaa gccaccaga
45121 gtcacaaagc catatctcca Yctaggctct atactggaaa gctggtcagt agtaacacaa
45181 agaacaagcc atttgggaaa acagcccaca tgaaaagaac tgtggtttca agaagagtca
45241 ttccatccca ggtttaaaat actcttctcc tctttatcta ccttgaggac tctatctat
45301 ccttccatac cagatccagc ctcatcttct aagtgaagcc ctctctggg acgtcagcSt
45361 ctctctgca tcccctagca ttttatgcat cctctgttaa agcaactgtt tgcacagctg
45421 Yatccaccac taaacttaga ggcaacagac catggYtttg aatgtgYaga acccaacaca
45481 gagccYgaga cctagtgggt attcagtgc tgttgaagg aagaatgaat gcatgagcaa
45541 acaagacaat ggaagtctgt catcagtatt tacatttcaa aatgcaaagt gaaaattgtg
45601 caaatctcta atcaagctgt actttaaaat gctaaattga tttggctaaa aatatttcaa
45661 cactgaaatt tctttttgca agttaagtct tgcataacc aaaacagaRa agaacRtatc
45721 aatgaactaa atagataaat ttatggctga caaaatctca agatttagtg tgtgagagga
45781 aagtaaaatt caatgtgtcc ttgaaagttc tggggcttaa gatatacagg ccaatggaat
45841 agaatagaga cttcagaaat aaactattgc atatatggtc tgataacttt tgaaagtgg
45901 tcaaagatca tttaatgaga aaaaaaggag tcttttcaac aactgggtgt gggaaaactg
45961 ggtatacata tgcaaaagaa aaaagttggg ctcttacctt atactatata caaaaattaa
46021 ctcaaaatag aacaaagacc aaaaaataaa agctaaaact ctaaaattct tatgagaaaa
46081 ctctaaaatg cttaggggaat aacttcataa cactggattt cacaagcctg tcttgaatat
46141 gacaccaaaa gcacaggcaa cataaataaa agagacaaat ttgcctgcac taaaattaaa
46201 cacttttgtg agtcaaacia gctatcaaca aagtcaaaag acatcctata aaataagaga
46261 aaatatctga aaataattta tctaataagg gattaatatc cagaaaaaaa aatatatata

```

```

46321  tatatgtata taacctacaa ctcaacaaca acaacaaaaa caacccaatt taaaaatggg
46381  caaaggactt gaacagaatt ttttccaaag ataacactaa tggccaataa gtacatgaaa
46441  ttatgctcaa catcactaat cattgggaaa atgcaactca aatccacaat gaaatacttc
46501  gtagccatta gtatgactat taccaaaaaa tcagaaaatt acaagtgtctg gtggagatat
46561  ggaaaagttg caaatcttat gcactgggtg tgggagagta aaatgggaaa gtcactataa
46621  aaaacagtct agtgattcaa aaattaaaaa tagaattaac atatgattca ccaattccgc
46681  atgaagatag caggaaattg aactgatatt tgcacatcca tgttcatagc agcattattt
46741  acaataacca aaagggtggag gcaacccaag tgtccatcca cagatgagtg gataaacaaa
46801  atgtgatata cacatatcat gggatatctt cagccttaga aaaggagaga aattctgaca
46861  tatgctataa cacagatgga cctttggaaa gttaagagat tgtcttattt atcttacgct
46921  aagagaaata agccatccac aaaaggacaa atgctgtacg attccacttg tgtgagttac
46981  ctagggcagt caaattcaca gaaacagaaa gtaaaatgat ggtttccagg ggctgagaga
47041  agggtagaat ggaaagctat tgtttaatgg gttggagtgt cagtgtgaaga aaatgaaaaa
47101  agttctggag atggatgatg gtgagttttg caccacaatg tgaatgtatt taataccact
47161  caactgtaca ctaaaaaatg gttaggatga taaattttat gtataatttt ctataacaaa
47221  aagtcataaa aatcaaacat ggttcttctc attaaaaaaa aaagaagatt cctgggtcta
47281  gttggttctc cctccttctt agttcttggg tcaaggagat agaatttgtt ccaaagtgc
47341  caagtgcact acggagtaat gggcttccat ctagccactc cctgctttat gactgagctg
47401  cactgggaga ggcattgtca ggggaaattc caggtttcta gaattgggat ctagccagaa
47461  tttgtcccag ggctaagtgg ctaaggcagt gaactagtct gtcagcttct ctgtttttaa
47521  tggagtcatg taattccatt acataccctt tgctttcaac tatatggcca aacatgactg
47581  gccagcaggc tgggggacag aagacatgtg ggcttgtgct tgttaYctgg aattgaaaag
47641  agctcttggc atgggtcttg ttcaagctcc atgggtgact agcacatgac caccaagaga
47701  gctactgtac ttctccgaga ctcatthttt cttctgtaaa aaatgactga gtttctttca
47761  cagtgcataa atctthttct ccaggaacag agactgcccc gggcctgtcc aagacaacta
47821  ggaaaccaga gcagcagtta agccattcct gggcaggaat aaatgagcag atgtcagctc
47881  tcagaatctc agttthttct ctcataaaat ggaaaagaat actatthttt ttatgtcatt
47941  caccatattg tgagctgaag gcactttaac gatgctgagg ctgtaaacta atgcataatg
48001  tgatgtttat cattcttcac ctatgtttta gttactgagc atctcctgac accagagagg
48061  acgcaacaaa aatcacaaact cctagaactg cacagtctaa atggcaacca ctagcccttg
48121  tgacaactga tcacttgaaa agtgagtagt ccaaattaag atgtgctgta ggtgcaaaat
48181  atatgctgga tttggaagat gttctatgaa aaaagtatct cattagtcatt ttttatattg
48241  attacatatt aaaaagattc catthttggc atgctggact cttcagatat atcctgggag
48301  attgtattaa aagaaaatac atgatggaaa ttagtgtagg tagttactag aaaatgtaaa
48361  attacatgat tcacatccta tgttcactgt tctagacata taaatataac tttgagttat
48421  ttttaagcat gagaagacag aaatcgacga ataaagtga aaagctaaag attaaagata
48481  cttacaaatc attgttgtat tttttaagag gtcattttga gcatattcct taccattgaa
48541  gccctgcct gtctggctcc tctgccacc ttgttttgct aatgggtcat gctcctatat
48601  gtgcatagac gaggagcggc tctcagggac tgaccgtaag catagtcagc acagcacgta
48661  taccatgct ctgaccccag gttggcgtct tggaggggta agcattttcc cagtccttct
48721  ttgactcatc acagagggtat aaaacagcgt ctccaacacg tgattttttt tttttttttt
48781  ttttgagaca gagtcttgct ctgtcgccca ggctggagta cagtggcacg atcttggctc
48841  actgcaacct ccaactccca ggttcaatca attctcctac ctcagcctcc caagtagctg
48901  aaattacagg cacacaccac cagcctggc taatttttgt atttttagtag atacgggggt
48961  tcacaatgtt ggccaggctg gtctcaaaact cccgacctca agtgatccac ccatcttggc
49021  ctcccaaagt gctgggatta caggctgagc cactgtgcca gttaaaagaa aaaaaatatt
49081  caaacatatt tggtttctta ttgaggtgaa gttcacataa catgaaacta acagttttaa
49141  agtgaacaat tcagtagcat ttaattaaca atgttgtcca accaacacct ctgtctagtt
49201  ccaaacattt ttgtcacccc aaaaggaaac cacgtgtctc gaaggcagtc actccacatc
49261  accctcttc ctagtcctat gctttgcaca caactgactc accctgacag ttataacct
49321  aaagttaaata aaaattatta gtaaaactgca aaccctggc aagtgaatta cttaatatct
49381  cttaaaatcc tgacatcaaa tgattcccct gtRaggccat gagatgataa gaacatccac
49441  ctccctctct tgctccagtg gaatgaaacc ccctcctcaa ggaggggttac actcaggcat
49501  aggcccgatc actcatcata tattgacaga tgtgcaggcc tgagaccccg ccttctggag
49561  ctttctaata ctcttggttt ctcaatccaa tccttgctag gaattaggct cttctgctga
49621  atgtaaaatt tttccatctg cctccataaa gtatgtgcca cctgtcagct gactgggtcaa
49681  cccaagctc aaagtatatg gacatttttg ggtgacaat ggtgggcata catcttagc
49741  aaagattaag aaggtaccag aggaggacca gcacaacca gcaatgcagc agaatYcatc
49801  aggaaagctt tggctctggg tggagctcct tgctttagct ctgcctttga gcgcttgggt
49861  ggctggggag gcactggggg ggaaggggag gaagcaggaa ttcgtgtgct gcaaatttca
49921  ctacacttga ccacaacttg gagtggaag ggcactgtgg tRcgtctatc tggccttctc
49981  ttacaagcct taaaatgctg tggaatccat ctggatggaa gacgccatcc aattataaat
50041  ccttaggata ctttttattg ccctttaaga gtteYgatgc ttgctcttcc atRcccatat
50101  gtttctgctt aagaggcttc attcaaatca aattggaaga gaagtccaga ttaccaact
50161  acaattacct gagcaaaaat ccctcaatt atcttggtaa tccagataaa ttcgagtagc
50221  aaaggtagt tgcttgata gcactggcta agaactgctt tgtctcccat ttcaccttgc
50281  attattataa tctacttgat tacacttcat ttataacaat agggagggtc tgttttatgc
50341  cacacattgc cacttgctca agtgtaaaat aaacctaaa tgactgatgt actgctaaat
50401  ttatctcaaa aaacaatcat aacaggaaatc ttaaggcaat aaagtcaaac aaatagaatt
50461  ttacagaatt taaaaattat tttgtgagtg atttatgcta aaatacctca aatttatttc
50521  aaaaacagtc ttacttaaaa ctgacttaaa atatatgtag gataaataat Yttagtgaa

```



```

50581 ttttaacgaaa cttcagcaat tcaaataaat gcacRttatt cttcttataaa acagatatcc
50641 tgaaaatatc catcaggata aatagctaata gcatgtgtgg cctaatatct aggtgatggg
50701 ttgatagggtg cagggaacca ccatggcaca tgtttacctg tgtaacaaac ctgcacatcc
50761 ggcacatata tcttggaacR taaaattaaa ttaaattttt aaaaagcaga tatttggaiaa
50821 gtaccaatag cttcaaagta aaaataactct Ncactgtttt tgtttggttg tttattttcg
50881 tttttgtttt tcttttttga gatggagtct cgctctgttg cccaggctgg agtgcagtgg
50941 cgtgtttctca gcttaccaca acctctgcct cctgggttca agtgattctc ctgacttggc
51001 cgtgccacca tgcccagcta atttttttac attttttggt gagatgatgg ggtttcactg
51061 tgttggccag gctggtctcg aactcctgac ctctgtatcc acccgctca gcctcccaa
51121 gtgctgggat tacaggcgtg agtcaccgag cctggcctat gcaactgtta ttttatcacg
51181 acagttataa atccatcaag atgtcctgtg atttttcaac acaaattact caaattatga
51241 acttctctgt gtgtattttc cactggcctg tttatgaatc ctgctgatat gtctgctaca
51301 atttctccaa aggtctaaaag atgtttacag gacaaatgac atcatgacca tgtcaggcct
51361 aaatgtgttt atatcagttg ggttttagagg gtcttcaaaa catggcctta aaatctcagt
51421 tattatggag cttaatgtgt tcttgatgtt tctggagtMa tgtatttcta aaaatagaga
51481 aatagattgg ttaaaagaaa atgaattgtt ggtctaactc gtcttatgca tggctaacga
51541 aatgcatttt cactctcttc cgtgataata cgacacttaa aactgtgagg accaatgggg
51601 tgataagaga caaaataaac agtaaataga tactccatgt gagttactac tctgtaatag
51661 atagaaaaga tatttttatag aaaagggaiaa ataccacag acatataagc aatgtcctgt
51721 gggtgctatc aaatttactg ttagctgttt aaaactgcct taaagggttt ttaaattgtg
51781 cttttctacc atagattctt tagacgacag ccatcaagca gcaaatacct cgcaggaggc
51841 cattgtgttt ctatttgaac ttctatggat gtcaagctct gttcttcaaa atttagccct
51901 acagatgggt ggcccaccgg agagaattaa tctcactatg cagccaacac taccctttct
51961 ggatctttcc ccagtagtgt ggattctgct ctagtccaga attatgcaga ataagtatac
52021 ttcactcttag acaccataat tcttcaaata tctaaaatgt atattatgct ctccaaatcc
52081 tggatcatct cagggttaagt atctctcaaa aacagtccat cagataatat gattttaaat
52141 ctttatcccc ttggtcatat acccacaatc tcattctatt taccaatac cctactgatg
52201 cataaactac atatgtatat gtgtgttttt ttttaaaaaa aaagcaattc cactgtaatt
52261 ttagcagagg ttatttccac atagagctat gtatatgtgt atatacacat atctttatat
52321 tatatagttt tctgtgcttt cccagttatc tacaatgggc atatatgact tttatagcca
52381 ggtaattcaa tattcattca ttcagtgaac atcattgagc atccactatg ggctgggaag
52441 tgaggatgga gccacaaaca agcaaaataa aaaccctgc tcttgtggag ttcccttctc
52501 attggaagag acgtacagta aagaaaaaaa taaaagagta aagttaatag cctgtgagaa
52561 ggggatataa aagtgggaag gaagacaggg tgatgtgtga gaaacacttt tttttttttt
52621 ttttcagatg aagtctcact ctgttgccca ggctggaggg cagtggctcg atctcagctc
52681 actgcaacct ccacctcctg gtttcaagca gttctcctgc ctcagcctcc caagtagctg
52741 ggacttcagg catgcaccac catgcctagc taatttttat atttttagta gagacaggat
52801 ttcaccatgt tggccaggct ggtcgtctca aacttctgac ctcaagtgat ctgcctgcct
52861 tgacctcga aagtgtcggg actacagcaa tgagctgcca agcccgccct ggggaacact
52921 attgaatagt gtggtcaggg aaggctttac tgtgaagggt atgaagacc aaagaaagtg
52981 aggaactaag tcataaatga tgggtagaac attccggatt gcgggagcag caagtgcaaa
53041 ggccctgggg tgaggaatac caagaatgtt tgtgtgggca gagcagaaag aaccaagggt
53101 aaagcattag gagatgaggc tgaagaagta accgggatca ggtgggttag ggctcaggc
53161 cctggaggaa ggctggcagc gctggagcca caYggactga caatgtctag cagtcatccc
53221 ggctccctgt gaagaacaga cctcgtctg cagagaagcg aggacaatta ggaaagcaga
53281 gtcactatcc acgcacagga tcacgggtgac ttggaccaga aagagagcag tggagctggg
53341 gagtgactct tttcagttat tctcaggtgg taccagtggg atctgcagag aatacatagt
53401 taaaggaaat gtctggaact aaacatgact cttcaaactg gatcctactg tggcagaaga
53461 gaggcgactt tacatttctt ttcccaggat atcttattct aatgaacaca gaaaccgtaa
53521 aatcaagcca accaacatga tgaaaatgat tatataagg acacagccca ggctggattt
53581 gaactgatga gggaaaaaaa atctctagtg aaaattcctc tctctaacca cagccttctc
53641 tcttccatc tctgcctcac ccttgcctct tctgaagcct tcttgatgc tcatgaagct
53701 cYctccttct ttgactcatc ctattttccc aggacMttta tcaactcagg gctcttctcc
53761 cctccccaca gtcagctcac tgtgctctga ctagYtccct gaaattgctc atcctcttac
53821 taaccaggaa gcttctaccc gctcttggtc ttctttctcc accccagtgc caaagaacta
53881 agcactgatg gagaaaaagc atgcggctaa tactgtctgt ctctaccaca aatctcataa
53941 ttttttaaaat ccatttgga tttacattca ctcttcaact tcttttcat cactcctaata
54001 tcaactccta tataattctc tacacagctg ctgaaaacct tcttttctgc tgcctcttac
54061 cccaaaacta ctctcacatt actcacaag gttgaccttg ttttctatWt acttttttag
54121 agtaaYgaag ccataaaatg taagtctttt caacctggac ctcccactct tgggatttct
54181 caatagcttc acctgtattc tcccccttca ctcttgactc agaggtaaaM gctcccttgc
54241 tcccaaatacc ttttagcaacg taggggtgat aattgctcct ttccaaattt aatccctgca
54301 tctgcgcccc tgagacagac actgccatga tttcccagct tgctgtcttc tccctcctgc
54361 atctcctccc tttctctgtg acggatattt tccctgtgca agagaaattt cttctgcctt
54421 aaaataaata atccaaaaca tctcttgact ccacttaagc taacattcaa tatctcactt
54481 tcccttgat taacaaaagt taattgagtc agtacgggtc tacaattctc agacacaacg
54541 ataaacatga tagagaccat caacatgcct tggcattttg cctgctttct cttcaattac
54601 ttgcaacttg gcttctactg agctccactg aaaaagcttt catgacatga ccacatccaa
54661 tcccaaagaa actgtccctt tgcccagtg tcttcaaaac cctccaactc cacagtgtct
54721 cattaactcc aactcatttc ctactaaaca tctcttctca gctcttcaaa gtcaaagatt
54781 gcgaacccaa tctacagact tctcctctct tctcctttgg gtccaactcc atccttctcc

```



```

54841 atgaaacttc ttattcctag aaatgggtgtc tgcacctttt aggccttccag gctYgagcct
54901 agagtcatct ttaactcttt ccataccag actcccaaga cccagtcagc tgtttaggtg
54961 tctcctctgt atgcagcact tactgtcatt gccctgggtcc atctcccaga gccacatct
55021 tgtcccactg tctgcaaagc ctttcctata tgctggatat aagtgcaaac tccccctaaa
55081 atcccattga agtttttact tttttctatc ttcttttttt acttcttttt atcttcctct
55141 actcacacag aagtgtccca attatgagga ccttatttta ttccctttac tgtcaaacac
55201 aaagccaaca tgccatacga aaagatagta ctgtgcttcc ttcagtgcc ctctagcacg
55261 cccactccag cacacccttc ttgtgcgggt gtatgctcat gtgatactat cacaggcaac
55321 acttactatg caatacgttt tccacaatca caatatattcc acaatattgt gatatgagct
55381 cattcttcag gccttgacac aagcgccac aaacctaaga gaatgcattt tcatttttat
55441 gatacacagt ttctRactgc tccactctgg ctgccaggc attcctcctc caaatcacRa
55501 tgtctatata aaaagaagaa caatgaggga gagctggagg tagcgctaag aaacaacctg
55561 gtccagctcc caggtctcat agagaacact cagaacacgc ttgttagagg tatctgctcc
55621 tggcctcagc ttctcagaag caattacaca tcttctgggt aaacgtggag tgtgcagcac
55681 agaataccaa agctgagctt cccattgtac ctgggtgttg atctcctcgt tgacctcctt
55741 cagctgaata tttcttaaga acagtgttca attaatccaa ctatccctgg tggctggcag
55801 gatgaatcag ttatgactta tttcatgttt gtgggtgggt gtatgaagtg gtcctcaaag
55861 gagatttttg ctctctgcag acagtctgcc tgtctgtagg tcacttctct ccatttcctt
55921 tgagtgggaa tatgagccag ggtgttgga gaaggaagag tccaaaagat gtctcagggg
55981 atgtcccata gccattggcc tggctctgcc tagataactt ctgagccagg tcacctaaa
56041 gtgctacatg aaaagtcatg gatttttttt ctaacttgtt gatctcaaat gtcgtgattt
56101 ggcatagaata tctagcttcc catgttgtag ctatggattt attcttgcca aaatattggg
56161 gattgggctg gagaggggag aaggtacgaa gatgcattct gtgttgctca acaagatctg
56221 catggcctca accaatgcgt gtttgaccat atggatattt acaaacccca ccatcaactc
56281 accaaaatga agagtgtctt agacttattc tcacaagaca agaggggaac ctgcctctaa
56341 ggagtctctc tgggacacct gggagagatt tatttaatgg taaagcaagg aaaggaaaag
56401 atgaacagtg acctgcaaat cattaaagag ggcgactcga tcataggcaa gggcttttat
56461 tagtgctaaa attccacttc aaagtttgct gattcatgga tgctttttgt tttgctgttt
56521 aYgttgtaga aactgatttg attttcatag acaaaataac taggcattta taaccacata
56581 taggtatgaa agaaagataa aatgatgcc ttagcccagt cagaaatact cttaaccatc
56641 aaaatagttc cctgaatcta aYaggccaac aatattccaa caccagaacc tttgctacca
56701 tagccagaat ttttaagact gcaccactgt taagttagagg caatttttaa tacttagggg
56761 ctaaccacaa ggcataaaat gcaaaaaaaa ttacataatc ctgtactttt taataattaa
56821 atgaaaatac atagactcta agcaggaaaa tatctgagat ccttaaaacg gtataatcat
56881 aattgttcta cattggtaat atgtgtgatg atatttttct ccaaaaaaaa ttctctacca
56941 tttcattctc tttRatttct tctagcccggt aaggtctagc aaagaggaat acctgaaaag
57001 atgcaaattg taccctgtgt ctgttcaatg acagcaaaaa ttgcagctcc ccaacccccc
57061 ctcttatgtc cctgagcaa tctgtgatca cttgagggtg aggacagtat attgccccaa
57121 taaactggct ttccaccaag taccaccaag aaatcaaaac agcttttatt ttattgtgtc
57181 atcatatata agttaatagt tcataattag ttcaaaattt aaaattatgt tctaaaaata
57241 aagctttcta agtcaatgta ggcaacRatt ccaagatcct tatagttttc ctctcttaa
57301 cagagaccat tatcatatga tttttttttt tttttgagac ggaagctcac tctgttgccc
57361 aggcctggagt gcagtgggtg gatctctgct cactgcaagc tctgcctcct gggttcacgc
57421 cattctcctg cctcagcctc ccaagttagct gggactagag gcacccgcca ccacgcccgg
57481 ctaatttttt tttttttttt tttttttgca ttttttagtaa agaccacgtt tgaccgtgtt
57541 agccaggatg gtctcgatct cctgacctca tgatctgcca gccttaacct ccaaagtgc
57601 tgagattaca ggcgtgagcc accgtgcctg gccagtcata tgatttctaa agagaaactg
57661 aacagttatt tgtagaaact ctgcaaagca tgactttggg acgggcacag tggctcacgc
57721 ctgtaatccc agcacttttg gaggtgagg cgggcagatc acgaggtcgg gagatcgaga
57781 ccatcctggc taacatgggtg aaaccccgcc tctactaaaa aaatacaaaa aaattagcca
57841 ggcattgggtg tgggcgctg tagtcccagc tacttgggag gctgaggcag gagaatggcg
57901 tgaaccagag aggcggagct tgcagtgagc caagatcgca ccaccgcact ccagcctggg
57961 caacagagca agactctgtc tcaaaaaaca aaacaaaaca acaaaacaaa acaaaacaaa
58021 aaagccatgc ccaagcccac ccctgaccag tgaaatctcc gggattgggg cacaggtata
58081 atgttttttat aaacatcttc ctagatgttt cctgcatcca gggtgataaa tcatcatact
58141 aaaggcatca tctgaaggct cctagagtat agagaagtct agaataagga ccccaaacta
58201 ttgcacatcc tgacactaac tagctgtagc tgtgcacctt ggacagggag agatctaaac
58261 agctagtatt cttacttcac cRaaatctac aactaaagat gtctatccac gtgttatagc
58321 tttggcttcc ctaatctaga tgttcaatct acttttctgc aatttggcaa agtaaaacac
58381 acatatacag taatgcacaa tgtcctgatt gttgggggtt attatttgtt ttgcatttac
58441 gcttcttagg tatgtaacat gccaaagtca tgggagctga gtcttttgaa acagaggctt
58501 ctttgggtgc aaatattaat tttctatgaa aaaaagagaa agtacaaaaga aaagaaaaaa
58561 cagcagtaat acagaaatga atatcttcct tgtctaggac acagtgtttt ttttaaccta
58621 gatttctttg aacacagact gacacaaaaa ttaaatacta ttgctccatt ggagaggtgc
58681 aaacctgggg cggtgagagt gaggggaagc gagtgagatt gtcactacac tagcttctgg
58741 ggacatggag acagccagtc actgagcccc tgccttcctt tggccatgca gatgcctctg
58801 ataggttaca cggaaaaatt ctacctcaca gcagcccctg gggtgaggga aaaataggaa
58861 cttagttgcc tacattcttc ctgcatcccc ttcctcattg gtcagagtca cctgMatgt
58921 ctgggttgct acctgctccc aaggtgacca ctccaaaagt caggttctac gccgggtggg
58981 ggggtgcttc atccaagtac agaaatgcca agaggatccg gaaacctttt gacctggttg
59041 ctgagtcaca ggaaagaagg gccagccctc ctgggacagg taacaggctg gccctgagct

```

```

59101  gtggaagccc  tcacacccag  aaggagtcaa  tctgctgggg  tggccactga  gaccaagcag
59161  gagctgaggg  tcctggagta  atagatggag  gcccatgaga  tgtgttcaga  cacatagtgt
59221  gtttgtcaac  tgcaatgtgt  gtgtgcccc  aaaattcatg  ggtttaaate  cttaccccca
59281  aggtagcagt  atgaggagga  ggggcctttg  gaaggtgact  aggtcataag  gatggaggtc
59341  tcatgaattg  cattagtacc  ttacaaaag  ggaccccagg  gagattccct  cacccttttg
59401  tcacagtgtg  aagacccagc  aagaagatgg  acatctatga  atcaggaaga  gagccctcac
59461  cagaacccaa  ccctgctaca  ctctgatctc  agacttccag  cctttagaac  tgtgagaaat
59521  aagtttctgt  tgtttatatg  ccaStcaatg  tatagcactt  tgttacagca  gcccaagcta
59581  agacagccta  ttatgtatga  gcaggtggct  ttgagataat  tgagaaaaca  gagactataa
59641  ctacaaccag  ccagagatgg  gatcaYtgca  aatgggactc  gggttcacac  aaggtttgtg
59701  acacacacac  aaaaaaacat  aaggcagata  aatcagcaag  ggtagcagtc  aggaattgac
59761  agacgattaa  tggattgagg  aaacagaata  gataatttaa  aagcaaacct  ttgtacacaa
59821  aagaattcag  gaggtgataa  aagtaacatt  ttcatatcag  ttggaaagta  agttattcaa
59881  tagcaacaga  acaatcattt  attgaggaaa  aaWaactatt  tctttcctgg  ttcaatcttg
59941  ggggtgtgta  tgtttccata  aatttatccc  ttttttctg  ggttttctaa  tttttgtgca
60001  cagaaatgtt  ttttaatagt  ctctgagggt  tttttttat  ttctgtgggt  tcagtggtaa
60061  tgtccctttt  gtcatttctg  attatgctta  tttggatctt  ctctcttttt  tctttatcag
60121  tctagctagt  tgtctatcaa  tcttatttat  tctttcaaaa  aaccaacttt  tatttttgtt
60181  ggtcttttgc  atggtttttt  tgtatctcaa  tttcattcag  ttcagccccg  attttggtta
60241  tttcttttct  tctgctagca  gtaagtttgg  tttgctcttg  ttttttctag  ttctccagg
60301  tgtgacatta  ggctgttaat  ttaagatctt  tccaactttt  tgatatcagt  gtttagtgct
60361  ataaactttt  ctgttaacat  tgctttaact  gtatcccaga  gattctggta  tgggtgatct
60421  ttgttttcat  ttgtttcaaa  taatttatgt  atttctgtct  tagtttcatt  gtttacccaa
60481  aagtcattca  ggagcagggt  gttcaatttc  catgattttg  agagatatcc  ttagcattga
60541  ttttattttt  accgtgctgt  ggtctgaaag  tacggctagt  atgatttcag  gggttttttt
60601  catttggtgc  aaattgtttt  atagccaagt  gcgtagtcaa  ttttgaagta  tgtgccacgt
60661  gtaggtgaaa  agaattgcata  ttgtgtcgtt  gttgggtgca  gtgttctgga  gatgtctgtt
60721  aggtccattt  ggtcaagtgt  caagtttagg  tctcaaatat  gtttaagttag  ttttctgcct
60781  tgatgatcta  tctaatactg  tcagtgaagt  gttgaaatct  cccactatta  ttgtatgggt
60841  atctaagtct  ctactagggt  ccctaaaact  tgatttatga  atctgagtgc  tccagcattg
60901  ggtgcataca  tatctagaac  agttaagtct  tcttggtgaa  ttggaccctt  tatcattata
60961  taatgccctt  ctttgtcttt  tttgatcatt  gttggtttaa  agtctgaaat  tgaaacgctg
61021  aacagaccaa  taacgaatta  caaaattaaa  tcagtaatat  aaagactacc  aaccagaaaa
61081  agccctagac  cagagagatt  cacaaccaa  ttctaccaga  tgtataacaa  agagctacta
61141  ccaatcctac  tgaaactatt  acaaaagatt  taggaggaaa  gactcctcct  taacctcatt
61201  ttatgaggcc  agtatcattt  tgatacagaa  acctggcaga  gacacaataa  gaaaagaaac
61261  ttcaggccaa  tattcatgat  gaacagggat  ttggaaatcc  tcaacaaaat  accagtaaac
61321  caaatccagt  accacatcaa  aaagctaate  caccatgatt  aactacacat  tattcctggg
61381  atgcaagggt  ggctcaacat  atgcagatca  ataaatgtga  ttcattcccat  aaacagaact
61441  aaacacaaaa  accacatgat  catctcaata  gctgcagaaa  agacttccaa  taaaattcaa
61501  catcctttca  tgtttaaaac  actgacaaac  taggcattga  aagaacatac  ctcaaaatac
61561  taacagccat  ctatgacaaa  cccacagcaa  cactgtactg  aacaggaaaa  gctggaagca
61621  ttcccatga  gaattgaaac  aagctaagga  tgccactctt  caccactctt  agtcaatata
61681  gtactggaag  tcctagccag  agcaatcaag  caagagaaaa  aaaaaaaaaa  gaaacaaaat
61741  acatccaaat  gggaagagag  gaagtcaaac  tatctctctt  cacagaggac  gtgatttatg
61801  tctggaaaaa  ctcatgtgat  ctgtctaaaa  actcctggat  ctgaaaaaca  atttcacaac
61861  gtttttaggat  acaaaatcaa  tgtacaaaaa  tcagtagcat  ttctaaacat  caacaatgtc
61921  caagctgaga  gccatatcaa  gaatgcaatt  ccattcaaaa  tagcaacaaa  aaaaatacaa
61981  tacttaaggg  tacagataac  tggggagtga  aaatctctat  gacaagtatt  acaaaacaaa
62041  gatcaaagaa  atcagagatg  acacaaagaa  atggaaaaac  attccatgcc  catggatagg
62101  aagaatcaat  attgttaaaa  tggccatact  tcccaaagca  acttatagat  tcaatgctat
62161  ttctatcata  ttactaatta  cattttcaca  gaattagaaa  aaactatttg  gaaattcata
62221  tggaaccaca  gaagagccta  aatagccaaa  gcaattctag  gaaacccaaa  agctgaagta
62281  tcacactacc  tagcttcaaa  ctatgccata  aggccacagt  aaccaagaca  gcatagaact
62341  agtacaaaaa  cagacacata  aaccaatgga  ctagattaga  gaaccagaa  gtaatgtcac
62401  acatctatag  tcatctaate  ttcaacaaag  tagacaaaac  aagcaatgtg  gaaaggattc
62461  cctattcaat  aaatagtgtt  tggataacta  gctagccata  tgcagaagat  tgaaactaga
62521  ctctttcatt  ttaccatata  caaaaatcaa  ctcaagatgg  attaaagact  taaatgtaaa
62581  tcatacaact  ataaaaacct  agaagaaaac  ctagaacata  ccattctgga  cataggccct
62641  ggcaaagatt  tcatgacaga  ctccaaaagc  aatggcaaca  aaaacagaaa  ttgacaaatg
62701  ggacctaat  aaactaaaga  gcttctgcac  agcaaaagaa  actatcaata  gagtatacag
62761  acaatgtaca  gaataggaga  aaatatgtgc  aaattatgca  tccaacaaag  gtctaataatg
62821  cagaatctat  aaaaaaaaaa  ttaagcaaat  taacaagcaa  aaaacaactt  ctttaaaaaa
62881  aatgggccaa  aaaaacatga  aaagacactt  ctcaaaagaa  gacatgtgtg  accaacaagc
62941  atatgaaaaa  acgctcaaca  tcactaatca  ctagagaaaa  gcaaaccaaa  accaccatga
63001  gatatcatga  cacaccagtc  agaacggcaa  ttttaaaagt  caaaaaataa  cacatgttgg
63061  tgaggctgca  gagaaaaagg  aacagttata  tgctgcgtgt  gtgaatgtaa  attagttcag
63121  aactgtgga  aagcagtttg  gagatttccc  aaagaactta  aaatagaact  accattcaac
63181  ccaataatcc  catcactggg  tatataaagg  aatataaatt  gttctactgt  aaagacacct
63241  gcattattca  cagcattatt  cacaatagca  aagacataga  accaatctag  aagtcacatca
63301  gtggtggact  ggataaagaa  aaaaatgtgg  tacacaaaca  ttacagaata  ctacacagcc

```



```

63361 ataaaaataga atgaaatcat gtccttttgca gtaacatgaa tggagctgga ggccattatc
63421 ctaaggggagt taacacagga gcggaaaacc aaataccaca tgttttcact tataagtggg
63481 agctaaacac tgagcacaca tggacacaaa gaatggaatg atagacacca ggggctgctt
63541 gaggggtggag ggtagacgaa ggggtgaagat tgaaaaaacta ccaattgggc actatgctta
63601 ttacatgggtt tatgaaataa tctgcacacc aaactctcat ggcattgcaat ttaccacagt
63661 aacaaacgta cacgtgtacc cccgaaccta aaataaaaagt tagaaaggaa aaaaaaaaaa
63721 ctaaatccct atctcacatt atacatctaa aaaatccaaa tagattagat ttaattaaaa
63781 attaaaccat aaaacacaga aagaaaatac agatgaatag ttatataatt taggatgaga
63841 acagcctctg tcaggatgaa ctaaagaatt cacaaaaaaa aatgttaaca aattaaatga
63901 catgttaaaa atctggccag gggtagtggt tcacacctgt aatcccagca ctttgggatg
63961 ctgaggcggg cggattacct gaggtcagga gtttgagacc agcctggcca acatagtga
64021 acctcgtctc tactgaaagt acaaaaatta tccaggcatg gtggcacacg cctgtaatcc
64081 cagctactca ggaggctgag gcaggagaat tgcttgagcc cgggagacgg aggctgcagt
64141 gagctgagat catgccactg cactccagcc tggctgacag agggagactc tgtctcaaaa
64201 aaaaaaaatt aagaaactat atattgaaag actataaaaa atagttttgg ttttttctc
64261 agtaaaaaaa taatatatcc attgtcaaaa attttctatt ttcaatatta ttatttaata
64321 gaaaaatttc acaattttct ggagaaaata tatgaaacac atttgacaga gttttaacat
64381 ccttaacata aaggatgtaa cttatatgtt acatccttaa cataattttc tttgttcagt
64441 taacaagttt ttattgagta tctatatgtg aatatgcact atgtctgaca ctggcaacac
64501 atttgaggaa ataaagaaga aaaattcaag tccacatgga aaaatggact aaggacatga
64561 aaaagtataa atcatcagta cacttcta ataaagtaata atcaaagaaa tgcaaaataa
64621 tgtgacctat caaggctctg ctatttgtac tgtcaaatta taaaaataca ataacaataa
64681 ttggcagata ttggggaaac aagtaatgtc atatactggg atgtgcttaa actggtaaaa
64741 gtcttcagaa aggaaattgg aaatatatgt aaaaattttg gacagttgca tattctttgt
64801 tctagaaatt ctacttatat gattagaacc taaggaagtt atcatagatt taatcaaaga
64861 tagttacagg atattcaaca tagccctgta tataacagcc aagaatctga agccaacaaa
64921 aaatatattag cttaaaatgt atagaatata cataggatga aattgcatag gtcactaaac
64981 agtttctagg gacatggaaa aaaaaatgcc atattgcaga aatgcaatat tttgggatga
65041 taaaaggggca gtttcaaaaa attgaaaaaa tagcagttac tatgacctct tttggcaaaa
65101 ataattatat gtaatattgt tcatggaaaa atagactgga aatataacga ttaaaatggt
65161 aattgtatct gggttggtga gattacatat aattattata tataatcttt acttttttag
65221 attgttggtc acagtgcacat caagatttgt catgggagaa aaaatgaaga agattattat
65281 tttgtagtca cccaaggaga gaagaagtca catctctgga gataggagga gatagggcac
65341 atgagccaat cacatttctg cagccttttg tggatacaaa aggggtgggc caagcctttc
65401 caatatccct tttcctcctt ggtaccagga cagactatat ttaccagcct cctttgcagc
65461 cagggtgtgg catgtgactc attcctgggtc aatgaaaggt agatggaagc ctggcctagg
65521 aaacagggtc acatgcaatc ttccattctt ctcccaccca ctggctgaaa agaaaggctt
65581 ctgaggacac agagtggggg gaaggctagg tagaggctgg atgggaagaa agcagggttc
65641 tcttgctcct ctcatcagag agctactgag gagaccacac gcaccagac cccatactg
65701 gactgttaca ggagtgcagaa ataaactttg ttttagaccac tgaaatttga gagttagagc
65761 tattagccta ccctgattaa cgctggggta gccctcaca tctgccagc accctcagca
65821 gagcctaacc caatcatcca aggttaccca atagagaact caggcttcca ctagagtagc
65881 cgtcacatag agttactggg tcttccaggt tctgccacct ccaccgtgtt ttgtgggact
65941 ctccactgaa ctcaaaagc acatgtattc agctactcca aagctatgtg tactcaggaa
66001 gagaaagtcc taaatgtttc tgtgaccttg tgccactgat atcatgggtt ctatccttca
66061 gagtgctaag aaaagtgtta aatctccaga atagcttttg aaaagtggag aaatttgaga
66121 ctttctctat ttttagttgc taatatgcat tcctgaaaag tttattttaa gccacaagga
66181 aatatttcca tattgaattt caatattgca atatactatt ttagaataaa atggaaagat
66241 ccaggacata gagcagctga gaagctacac agttggcccc tgggcttcac tcagacagt
66301 cttctctagg ctgcaagtca taagtctttg tgtcaccac ttttagaaga catcccccg
66361 acttctggga ccaacctgag gttttagtag atctctgagg atcaatgatc aaacatatat
66421 tagcttgaaa aaaaactaat atatgtgtat gtttttttaa aaggttaagt ttttaacaat
66481 ttagacgtct tggcattata ctctgagaac gttaaccaat gagaataaga gtgacaattt
66541 agatgtaaaa cctcttaaag gtaaagataa aatcctaacc acatggggaa aacctgtgt
66601 tctgtggatg atttccctgg atttctcaaa agactcttag aatgttctgg gtatgacttt
66661 gggggcatct gttctatgaa gatgggcacc ccagcatcac ctgcatatta acccttcttc
66721 ttgctcctaa agatgcagaa ttagctgaga ttaggaagat gtacaaagtg ttctccctgc
66781 acttcaacta atgaacaaaa ctttttaaaa attacttatg atttggaact attttatcat
66841 tttatRtatc ctatggcaac tggcatttta tatttaattt tatcatcttt tgcttttttt
66901 ctttgatcta aatcaggatg ctaagttttg ggggggggtc ctacagtttt ggcagagacc
66961 tcattctaaa aaagaggtag cagactatta aggcagaatc tgctgagggt ggcccaaac
67021 ctgggtctggt gaacctcact caactcatca ttgatttcaa gggcacagaa gaggcaagga
67081 gatgacagca ggagaaatgg acatgtacca tggagaaagg ggaccaacca caccttctgt
67141 ccaaactgag atttcccagc ctgaaacagg tcaacactgg ggttagcaag aaactttaaa
67201 ctgaatagga gattaaagta ataagaagat gagtactatt attgKtaca attatatgg
67261 taatagtttt aagtttcatt ctttaagaca ggggtgaatc cagtcccttc tctcaaggtc
67321 cttgtcagca ttctactttt ccaaggacat tcaaaaattt ctcatccaaa gtcaaacatt
67381 agtgtgtgtg cctcaaacia gaaatagttt tccatcagtc tccaaatctt tgaatagtaa
67441 atggcaaaag tatggaaatg caagatggag tggggcttaa tgttgccaca acattcctac
67501 aatactggga tagtcttcct tgggaattac tttctttcct atcacgtatc aataaggaaa
67561 gccaaatgta gaaataaaga aatctccccg atttacttaa cacacggagg tgacagttac

```



```

67621 agcgcaaatt gaggggaagag taaatgattt cMacaaatga accaaaaaca cttaaaagcc
67681 acattttaaga gaaatggagt cataaaggca atattttgtga gcagataaaa aatcagcaca
67741 gaaaaaggtg agaaatacac aatgtctttc atcaaggtgc aaggaaatgt aaaataacat
67801 taaaagtacc aactacataa tttgaatata aagagaacaa tagcaagaaa ggagagggga
67861 agtgatggcg atatggagac acagtctctt ttgcatgcac agggcagaac cgggtgcctca
67921 ggctggaggg tgtctgtgag taccaccaca tgaaRgcaaa agagcMccca gcattgaagc
67981 cacagacctt gctccatgaa tcctagctga tgggctggca cagagagatc aggagcagaa
68041 caaggaaatc cataggagga tcctcccaaa gtactttttt ttctggtcca aaaatcctta
68101 aatctgtcag aagcaggagg ttggagtggg agaattgcag agcctggaac acacctgcct
68161 gctgatgacc cattctgagg gggttctttc cacttggcag caatggactt ggtaaaaaaa
68221 ataatagatc cttctccatg gatcccatth cccttttttt tttttttttt ttttttgaga
68281 tggagcccca ggcagaatta aagaccaact ctgggaccca aattttttaga ggacaaaggt
68341 tgatataatg gccagcacga tttagtcttt tagatttcag gtctaactaa ctgatgacag
68401 actttaacaa aatcactgaR agaaatttaa cgtcaacctt aaataacagt agaggcaggt
68461 aatataacaa atagagtcaa aatggtttat cttaaaggctt aagcccaaga aacatccaac
68521 aataaaaatta atctaaaaca aattttttaa taatcatttt tttttcttga gacagagttt
68581 cgctcttggt gcccaggctg gagtgccatg gcacgggtctt ggctcactgc accccctgcc
68641 tcccgggttc aagtgattht ctgcctcagt ctcccaagta gctgggatta caggcatgctg
68701 ccaccacgcc cagctaattt ttttgtatth ttagtagaga tggggtttca ccatgttggt
68761 caggctggcc tcgaactcct gacctcaggt gatccacca ccttggctct ccaaagtgtc
68821 gggattatag gcgtgagaca ccacaccgg cctcatcttt tctttaacat tacaatttcc
68881 catcatggtg gcacttgaca gtagtgggac tgtccaacag caaatgacct catctaagca
68941 ctccaggacag aagccatttt aggtcatgaa aattatacag attttgtgag tgaagggtcat
69001 ttagttctga gcagaaagta gtcttgcaaa agggaaattt gcaacaacaa caaaaaagga
69061 caaggagggt gacaatgtca agcaaatgat aaccctgctg gagcttcaga aggaaccagc
69121 tacatccctt tcctgcttct acagatgcta tggcagcccc agaggtgtcc cactaggatc
69181 tcccttcaag aaagaatcta gcatgcatct gaacaacctc cagctgttca cacctcaggc
69241 cctgcctcat cccagacagc cctgagccaa tcactgacac agcagggtac tagagcctgg
69301 tcatttctgc ccaaccgggg gccctccaa aggcaagctc tgctccagac ctccccgttg
69361 gggttggtcaa actatcaaat ctgtacctgg tctgaggctc tccctgccc gtcttgcttc
69421 atcctcattt tatccttcac aggcacagcc cccttcccc tccaataaaa cactaacatt
69481 cctaattccg tctcaacatc tgcttcccag ggaacctaac taacacaata ctctaaaac
69541 caataccagc aaaaagtgc tttccaagcc cctacatgaa gactcatttt ctggaaaata
69601 aaattttaata taattccaat taccatgac gctatttagc catthcaaag gaaatgagaa
69661 agcttcccaa attgtggtcc tcatggagtg aactgatcat caaatgttgc tgtttacatg
69721 agggcacaca ataattaggg ttgtatgtaa catgctactt tcagattttc aggtaagtct
69781 aaatgctttt aattgatgca agaataataa gtccttcagt tgatttatgt catgcattaa
69841 tatcaatcaa aagggttttct aacacatact ttttaatact ataaaatgtg gggttttttt
69901 taatgtcttt tttttcttat tcagagccac atthcttcac atgggtatgt ttacctaac
69961 taagggttat gtgttctgtt tgtttttaat ttcagggttg aggaatcaag taacagggtc
70021 ttctaaatcc ttttattgga tatatgttag ttttccatta tcataaaaga ctgaggaaca
70081 ggaacagcag catattgttt aaatgattca caggtaaaaa tatcttctcc ctcttggtct
70141 gttttctttc ctgatgtctt tgctcattgc caacattgtc tattttatat ataattcttg
70201 caggacattg tgccctgaag gtgaaRttgg acaggtaagg agatgaccca acacccttg
70261 tcacacctgc aggtcttagg tcacttttgt aacacacaat gaaatgggta aattctacac
70321 aatccttttt tttttttttt caaacaataa cagaaagtaa atatttgaac tgggggcttt
70381 ttcaaacaac acaagtcaga aaaaattgac ttgtttttga ctgttacttt aggcataatat
70441 ttttgattaa tgacaattaa atgtaaatat aaagatatth agactaattt gaagggtccat
70501 aaagaatgca agaatcacct ggtaaagtt agatatthtg agactaattt gaagggtccat
70561 ctggataata ccatatcata aaattttata agactaattt gcagtgtatt tacagcatat
70621 attattgttc gtttttcaat attgatctta gcaatctac aagaatcac taactaatag
70681 atgtttaata caaacaacaa agactttcca gaaaatctac aagaatcac taactaatag
70741 ccatgcttca gttaaatttg tttacttttt aaagtacatt ctgagaagta acatgtactc
70801 tcaattaagY aaaacacaac cagaattttg gaatttgatc tttaaaataa taaaaaaact
70861 ttctctgcta ttacagcct tggttaaaat cccaacatct ggataccaga atctgagcag
70921 caaaatccac ggagacacat gtgcaatttt atgcctgcaa gctcactatt atttagaacg
70981 aaaccaacgt agtgcatact cccttggttc ttgctacaca gaatgtatcc agagtacaaa
71041 ctaatgtaga ttattataaa actcagtgtg tagatattat atatatatac acatgcatac
71101 atacacgcac atatataact aaaacaaaat cttcaaaaat aatacttttt ctttctgtat
71161 gtgatgtgcc ctgatagttt ccactttact ccatcccat tcttttgtt aatactggcc
71221 ttgactcact tagacaaatg ggtcatgacc tgtagtthtg aaaacagggc tttccagcct
71281 ggcttttaaag aggttggtcc tcaggccagc agaaccagca gcacctgggg gtagtttgtg
71341 gcgcacaatc tcaaggcctg ccctagacct actgaactag gatctgctct tagcaaggct
71401 cccagggtgac ttatggatgt attaaagttt gagaagccgt cctcctgcat gcaaaagtac
71461 agaatgagta tctgtgatct gaactacatt taaatcgata atgcacctct taaactgtct
71521 ttgttcaaag aacttctatc ctactgagct caaggagcaa cacagtttct agcaagatag
71581 gtgcaaagaa aaattcactt tcaatttcat caactgcttc aagagggtgc agggactggc
71641 tgacctggta tcccagctcc tgcaggaccg agagtgtggg aggtgggttg aggggaggta
71701 ctgaattgac tgcaatagat ccatgagcat ataaaagttg gcgtgtttgt tcttattcct
71761 gggagaaaat atatagtht cacctaattt taaaagagtt ttatggthta aaaagthtaag
71821 aagagctact aagccatgaa aagacgagga ggaagcttaa atgcacatta ctataccaga

```

```

71881 taagaaaatc tgaaaaggct acatagtgtg tgattccaac catatgacag tctggaaatg
71941 gcaaaactat ggagatgtaa aaagatcagt ggttgtcagg gcctaggagg tctggaggga
72001 tgaacagaca cagctcagtg aatttgaggg gcagtgaac taatctgtat gatattataa
72061 tgggtggatcc gtgtcatcac ctgtttgtcc aaacccacag aacatataac accaagggtg
72121 tacggtgttt atattaaagt ataaccctaa tgagaactct ggactttggg tgataatgat
72181 gtgttgatgt aggttcagcc cttgttacac gtcagccacc catgtgggaa aatgttgata
72241 gtgggRgaag ctatgtatgt ataggggcag gaattatatg agaacacttg tggatatatg
72301 tcaagtctgt tgtgaaccta aaactgctct aaaaaataaa gtctgtagggt atctatgaaa
72361 gcgcagacac atgggtccgtg agagcacgtc ctctctgcta taaattgggt gtatgggttac
72421 aatcatacct agaaaggaga gaaaataaag agtaagtga taccgacatg ttcaattctg
72481 cccagaata caacaaagtc cctgaatcac tcttgtttca ttgttgccat tgcttattca
72541 attcagtc aa ctcgtatatg tgaagcatgt gctacatata taacgtataa tgcaggatgc
72601 aaaaatgatt atgtgatcac ttcaagtaat ttataatcta gcaaacatat aaaacaggca
72661 cacagataat ccttacatag taaatgcctc ctttttcccc aaaatggcaa ggagacaaat
72721 agcaaggatc cgaggacaga gaggcaaaat tcagaaggcc agaaaggcat ggagccagaa
72781 atccaattca ctgcgcagta aggtatcggg agagagtgggt gtacaacgtg acagggacac
72841 ctgttgctcc caattgtaat cttttctgat tggtttatgc ccctttccaa ttactgtgtc
72901 catgctaatt atcaactatt tttattatca accctgcaga ggggactaag agaaaaaaa
72961 aaactgctgc aaagtgatgc tgtgttcatt ttgcacagaa cccagaaatc ctgatgaagg
73021 aaactgaatt ggatgccaca agccttatct cctgtgaatg ctgaatgact ttgtcgggtg
73081 gttttacgat aagatgtact ttcttttata tctattaaac aagctatata gaatactgggt
73141 aaatacacag aagtaaaaag aagaataaaa tagataaaat tttctaagtt aaaagctaag
73201 ggaaaaataa aaagaattat caattgatgt gatcaaagaa aaatgtttat ctcatgggggt
73261 gttggaaaag gaacatcata aaaattaata ggtagaataa tcatcaaaaa caatctgcac
73321 aacaaatatK acatagctga ggggaactat cattaaaata taatgtatac aaattgctga
73381 gaaactcact acaccttcta aatcatgtca aaagagtgtt ttgcatataa gctgtctgca
73441 cttcttctct ctctctYttt ttttttgctc atattcactg caagggtggct tttgtccacc
73501 catgcaaate actcatatga aggtcacaaat gatgtccagg tggccaaagc ctgtggctaa
73561 tcctcagtc tcctctcacc gagacagcag tttcttagcc ctctcctac ctccactggc
73621 ttctcttctc agctcctctg tagttccccc tcctctttcc aacctgtatg cattggaggg
73681 gcccaaagct caacccta at gctcttctgc atcttggtcc ctaggtgatc tcacctagtc
73741 acccagcctc agatagcctt aggttagga atcacaaata tatctctcac atgacctcta
73801 gactcatatc aacctctcaa catcacaaat tggatatcca acaggcatct ccaactcaac
73861 acagccaaac cccacttttg acttcctgct cattgcaact gtccctctct gcagatgtcc
73921 ctttttagagt aggtggcacc atcatataacc cagttacaaa caaaatcttt aaagtcatcc
73981 ttgactctcc tacactgcat atctaatacca tcagcaaatg ctgtcttttc caccttcaaa
74041 gtagatcccc agtctgatca tttctcacta cctccccctt cgctgcctgg tgcctggcaa
74101 tggcctccta attggtcttc cctgtttcaa ctcttggtcc cctctagac tgttccccac
74161 acaacagcca acatgggtct tttagaactt caaccaatgt aaattatact tcaagaaagc
74221 tttaaaaaat tcaatcagat cacatctgct atgaaccttc caatgggtct cctccgcag
74281 tgtgccaaat aaaatggaaa tgcccttata cttgcttaac agaagtctac aacacagcct
74341 caccagcatg cctccaactc acatcctgca gctttaacct cactccacRc cagccccag
74401 tctccttgcc gttacttgaa agtgccagga gagctcctgc caaagggcct ttgcacatgc
74461 tgttccctct ctctgcaata ctcttccccg tgtgatcata cggctcatgc tccactccc
74521 ttcgggtctc agcttgaatg tcacctctc cctatgacct tccctaacct ttcgtgtaa
74581 attctacctc tcccttctc agtctcttgc ttctcctgct ttgttctgga gaataccNaM
74641 cagcaccacc tgatttgtaa ctattccctt gagcacattc tatctcagcc acgggaatgg
74701 aagcttcatg caggcgggga catcatctgt tcagttcatg ctgtagccca gcaattctga
74761 atgattagat tgaaattgga tccaaaaata tcacaaatga gataacgtaa cttgttgata
74821 agtgtgtgaa gagtatgaag agatgatcaa gctcacaagt ttccaagtgc taacatctat
74881 aaaactccat tgtcaccat caaatcagca aagattaaaa accacaatag aatgtgataa
74941 aatagtgtc tcagatactt cctggagaag tatagatggg cagaattggg tgatctggta
75001 tcaatgatca ttctttcata ccaatacacc atgggatttt ccagcaaaaa cccataataa gtaggacttc
75061 acacagaagg aaaagaagg tgaagattaaa gtccccatgg gaaaatgcta atttagtgc
75121 ttcctattca ttagtaagaa agagttgggt gtccccatgg agtggtccca cactgagtcc
75181 ctgaaccact gtaccctcca attcctgctt cccccacaa attgcacaga cagggtctag tcagagacag
75241 tacaacgagg ataatgatcc tcaaccccc aactcaactac tgggggctaa ccctaagMaa
75301 tgatgccaac cttgctgatg tctctaaaac cctataagggt ggaagaagca acaagtgtca
75361 aattattgac tccgattcct aggttaattt gtggagccga agagacttgc tgatgttttg
75421 cttctcttct gggctctatg acaccaaata ccttagagggt gtgactagga tattcacaga
75481 aaacccaagg ccaataaatg ctctctaaac agaaacaaag aaacaaaaaa catgggtcct
75541 agccacgcaa aagacagcag ccttcaatga agaaacaaag ttgataacta tcaattatct
75601 tttataaata tttatcgatt atctaaggct aggttaattg ttgataacta tcaattatct
75661 gagcaagata cgcagaaaca cttcagggtgc ttgaactgca gcatcctggg ctccaacca
75721 aacttactgg agaagaagct ttagatacca ggaatctgca ttttaacca ctcctcaggg
75781 aaactgcccc agaggggggtc taggctaacc atgcgcaact tccaccatt ctctgggaa
75841 gtgattgtga atctcctcca aacccctctt acacttctctg attagttgg tgccccctac
75901 tgaatgtcag cctcactgaa tcttaacgag gaatcgccag actggggggg gNattgtgca
75961 gcatgtctgg ggaacacttc actacttcac taaacctgc tgcacacatg ctgaacaccg
76021 ttccaaaggc tacaggaact gagcaccgca ttggaatctg gccctggagg gtgcccagca
76081 tggcgaccct gaggggtRca ggaacccagt gagaaggaga aacagaagggt acagtccagc

```


76141	tcgagaccac	gcacataaag	aaatctgtag	gcaggggtctc	tattattgtg	ccatattaaa
76201	tatcttgata	ttttaagca	atattat	tctgattata	aaagtactca	ttgtagaat
76261	tttaattgtg	ccatcatcct	gcagaaaaat	gaaagtacaa	aaaacgaaaa	agcagctata
76321	cacggccaca	aagtcacagg	gctcatcggg	atgtgctaac	caggctggaa	actgatcaaa
76381	gctgatttat	tgagaaaaaa	taggcagcat	atcaaagact	tacatcagct	tcatagtaga
76441	cagacttttg	gggcggggga	actctgtctc	ttttgagtat	attctcaaaa	ggataaactt
76501	tcaccttcct	gtgaagcaca	gttactataa	atcagatttg	caaactgtga	gaaatgctta
76561	caactcaatg	agtcttttgt	cagccagtg	gggctccatc	gtgaaatcca	cccttcgcca
76621	tagcgatggg	ataaatcatc	accagccccg	agacatcgcc	taatcccttc	ctcgcaaggc
76681	agattcgggc	gctttctgca	tctgcttcgt	gttattgaaa	agagctcggc	tcatctgctg
76741	ggctctcagg	cttcacagtg	acctcgccaca	gaacgctgct	acttctgaaa	ctgttttaga
76801	ctcttcctgc	tatgaaacag	acacagagtt	taagtttagc	gtcttttatg	gtcagaaata
76861	tttagcgtta	cttcacagagc	ggcagccgtg	gaacaatgtg	ggaaagaagt	gcttcagttc
76921	acttcttg	aagtactgac	cctgggtcaa	tttaattttt	tccgtaagat	ttcccttct
76981	tacttttctc	cttcactgc	tatatgtaac	agtatctccc	cttcactgc	tatatgtaac
77041	agtatctccc	cttcactgc	tatatgcacc	agtatgctag	tatacaacat	tatagattaa
77101	taatatgcta	tattgtttta	aaatattaat	gttatataat	taacatgggtg	tgcattat
77161	tatattgaca	atacgtaatg	tgatgtgata	ataagtctca	ctgagtgcca	ggcaccgctt
77221	tgaatgctct	aaactcatta	gctaatttat	tcctcgtgat	tctatggggg	agatgcacta
77281	tttcattccc	attttacagc	tgaggaaact	gaggcagcta	gtaacagggtg	gagccaagct
77341	tcacactgag	atcatctggc	cccagcacac	tcataaaaaat	gagcaaaagt	ataaaagcca
77401	aagggaaaag	gaagccaagg	ggtgaaaatc	ctaattacaa	acaaatcctg	ggtaagctgg
77461	gttttttagtc	cttccccaca	tgtgaacagc	aactagaaac	ctgaacagtg	actttgtttc
77521	ccctgtcatc	cattgttggt	gcctgatcct	cacacaaaat	cttacggagc	agtatctagt
77581	gattagctta	gctgaattga	gcctggacac	ccttcatgag	ctggaggaca	gaggacgtgt
77641	cgatggagg	tccaacttca	ggcatctgta	ctcgcctgct	acagggtgagt	ggacctatga
77701	accccagcc	tcatcaagca	cccgagggtc	acctgcctgc	ttcacctgga	agagacagca
77761	aggtgtgatc	ccaggaagat	cctctgccag	gaggcttaca	ggcagaagca	gcggctgctg
77821	aacatagatg	ctgtcRgcag	gacacagggg	tgataggggg	tgagccagtg	gagcagggtga
77881	aggtgcagac	tacaggcagc	ccccctgaga	tcctgcccag	accccagcag	cagctcccct
77941	gtccctctct	agcagcttcg	ctgtgcccgga	agtgtttgag	aacagggtgac	ccatgccctg
78001	agtggcagat	gctgtgtctt	tttgatccct	tctctccctc	cccccccacc	cccagtgggg
78061	tacatggaag	gtttgctaaa	tgtttgttga	atgaataaac	gagcccaagt	cagaagcagt
78121	ctccaaatca	ttcctcatcg	caaaagggtg	cggtggaaaa	actcaciaag	ccaaggcagg
78181	aggacacact	caacttgga	acggcccggtg	cccagctttg	gaacaggcac	agcctgagct
78241	tcaaggaagt	cacttgacca	gcagtagctc	ccacctttcc	ttgcagctag	aacagcatca
78301	gaccaagtga	tctctaattg	gatgatttgc	taaagtacaa	tgagttttac	aactagaaag
78361	taccttctc	tcaagactga	cttcactatg	agccacctaa	tttttctct	ctcttctttt
78421	ggtatttttg	ttgcaaatag	tacacacaMa	acaggatata	taatctat	gtgcaattta
78481	aagaataaga	agcaaacacc	tttgcaKgt	ctccctagtc	cacaacagtc	agccccagga
78541	cctcagaagc	cccttatgcc	tttcccttaa	aactctcccc	tccttgacaa	ggtaattcca
78601	atgctgagtt	atgtggtttt	ttttccttat	ttttcttttc	aacacatatt	acgtttctct
78661	gaataatatg	ctttttaatg	ttgcctcttt	ttaatcttta	tttgtggaat	catattgtat
78721	gtaatctgtg	acttttttct	actcacatat	gagaaccatc	cacactgata	catggctaca
78781	gatagacact	tggagtttat	ttttcactgc	tgtatagtag	tccattgggtg	gagtacaata
78841	ggtttatgta	tccacttttc	tgtagatgga	cacttgggtt	gttctgtttt	tgctcataca
78901	tacctcctgg	tgctcaggta	caagggaata	cagaccaggg	gtgagactgc	tggatcacag
78961	gctaggcaca	tcttcagctt	tactaggtaa	caccaagcca	atacaaaagt	gcttgtacaa
79021	actcatgctc	ctgccagcat	ggaggaccca	ctgtgccaca	taaaaacatc	actgttatta
79081	acttgtttta	tttgcatatg	attat	cccttatccc	caaccacttc	tcaaagcaac
79141	tagccagcat	gtgccacaca	ggcaagcacc	cactccaatg	tgatctatat	ggttaggtat
79201	gtatgtaccc	tggaaaaccc	tgtgatgttg	cttgaggagt	atataacttt	tttatgtatg
79261	taagtagcat	gtgctacaaa	gcgcgttctg	ttttctgtat	ttttcactcc	actcagtgtt
79321	ttgtaaaaca	tgctcatggt	gctccatagg	tatcagagac	aggatgatgt	tttatcttta
79381	agatgggtac	gccaccctca	ttttatagat	cacagtgata	gctcacaatt	gtttagtact
79441	cagtggggtc	taaatgtact	aactcgttta	atctcccacg	aaccctgcaa	aacagatgct
79501	tccgtttcat	ataaaatgag	accaaggcac	aaagaaacta	aggaacttgt	acaaaatcac
79561	caagttagta	aacatcagag	caggatttga	attgagccag	aatgtgttct	tatccacgac
79621	atgaaactgg	ataagaatgc	aaagctcaga	gaattttcat	gactagcatc	tctgggatcc
79681	acagctggcg	accacggagc	agaactaata	tacagatggg	ttccctctca	gtccagtcct
79741	cattccatcg	gctccaaaat	gtgtattatt	ctatatgatt	agctggtgaa	caacaaaggc
79801	aattagttag	tcctcttcag	caaatgttag	taaatgaaaa	tattatagag	acagaactct
79861	ttttaggaaa	tgcaatcatg	tgaattttaa	aatgctttat	cagaaataga	attaatgaca
79921	aaaatattta	taggatccta	agaaaatgga	tttgctat	tttttgtcgg	ctgatgataa
79981	tcatctgggt	gcctcttttg	ttgtgacagc	tccaccctct	cagagagttg	Katcttcata
80041	cacacctaac	atgctaagag	tagatgtgca	tgatatggga	gttagtataa	tttctgtaat
80101	aaaaaaagta	cttgggtcatg	cctgtaatcc	cagcattttg	ggaggctgag	gtgggaggat
80161	tgcttgagcc	cagagtgttg	gaccagcctg	ggcaagatag	tgagaccttg	tctctacaaa
80221	aaaaataaaa	attagctggg	tgtagcgggtg	cacacctgta	gtcccagcta	ctcaggaggt
80281	tgaggcagga	agatcgcttg	agcctgggag	gcagaggctg	cagttagcca	taatcatacc
80341	actgcactcc	agcctgggca	acagagcaag	actatgtctt	aaaaaaaata	aataaaaata


```

80401 aataataaat aaaaaatttt taaaaaagggt acctggaacg gcctgcaaag aaagggaaat
80461 caaattatgc ttcaagacag tcactattat cactgacaga gaagcagcta aaataaacag
80521 cctgctcatt ttgtttgtaa atgaattgcc acaattcttg cactatttaa atcaagaata
80581 ttttatattc catagttttc aaccacccct ccttttttta ttgtttccag ctctttaaac
80641 atataaaagg ataaaagcca tttgtttctgg cagaaaagag tcatcataaa ttttgcagag
80701 tgaattttct taagatgaaa ggaatgttcc tctcctccag gacagcctac ggacaggact
80761 gtgatgacac agagtcttca cgggaatcac acctgcagtg ttaagccact tctgtggaaa
80821 actcaagtcc ttctcagata acaaaaacat tttagtagca atgaaccaa aacaaaatct
80881 tccactatat atgttaatac atcaaaagga accattcatg tgccatttat aagaacttcc
80941 ttccggccag gtgcggtggc tcacgcctgt aatcccagca ctttgggagg ccaaggcagg
81001 tggatcacga ggtcaggaga ttgagaccat cctggctaac acggtgaaac cccgtctcta
81061 ctaaaaaaaa aaaaaaaat gcaaaaaatt agccaggcgt ggtggcagg gtctgtagtc
81121 ccagctactc aggaggctga ggcaggagaa tggcgggaa caggaggca gaggttgcag
81181 caagccaaga tcgcgccact gcaactccagc ctgggcaaca aagcgagact ccatcaaaaa
81241 aaaaaaaaaa aaaaaagAAC ttccttccca gaaatcatag cagcgttctt cagcccaaag
81301 ccagaagaaa cttctcgcac atgaaatttt acttcaaaaa ctcccatatc aggcatttta
81361 atgaatcagt ggaagaaaat tatectccca actttgttgt caagaacccc aatttcatat
81421 gcagaaaaaa gaattacaaa aataattatt cgaattctaa ttggtgggat tttgataggt
81481 ttataaagga aataaatatc tttaacacaa ttctacctcg cagccaacat cagctattag
81541 caaccacact tcttattgcc agttcatctc tccaaacaca cagaagccat gtgagttgaa
81601 atttattttt taaaaactct cagttatgat ttctcaaaat tatatttcat atattgacat
81661 caaccaatat gatgatgata ttatatattg acatYaacca atacgatcaa ccaatatgat
81721 gataattgta gggaaaagaa agagagatct gactgttact gtgtctatgt agaaaggaaa
81781 gacataagag actccatttt gaaaaagacc tgtactttta acaattgctt tgctgagatg
81841 ttgttaattt gtagctttgc cccaaccact ttgcccctag cactttgacc caacctggag
81901 ctcaaaaaaa catgtgttgt ataaaatcaa tgtgtaaggg atctagggct gtgcaggacg
81961 tgcttgttta acatgtttac aagcagtata cttggtaaaa gtcatcgcca ttctctagcc
82021 tcaataaacc aggggcacaa tgcactgcgg aaagccgcag ggacctctgc ccttgaaagc
82081 ggggtattgt ccaaggtttc tcccatgtga tagtctgaaa tatggcctcg tgggatgaga
82141 aagacctgac tgtccccag cccgacaccc gttaaagggtc tgtgctgagg tggattagta
82201 aaagaggaaa gcctcttgca gttgagatag aggaaggcca ctgtctcctg tctgcccctg
82261 ggaactgaat gtctcagtat aaaacccaat tgtacatttg ttcaattctg agatgagaga
82321 aaaaccgccc tatggtggaa ggtgagacat gtttacagca atgctgcttt gttattcttt
82381 actccgctga gatgtttggg tggagagaaa catacatctg gcctatgtgc acatccaggc
82441 atagtacctt cccttgaact taattatgac atagattctt ttgctcacat gttttttgct
82501 gaccttctcc ttattatcac cctgctctcc tactacatte ctttttgcta aaataatgaa
82561 aataataatc aattaaaact gagggaaactc agaggccggt gccggtgcag gtccttggtg
82621 tgctgagcgc cgggtcccctg agcccactgt tgtttctcta tactttgtct ctgtgtctta
82681 tttcttttct cagtctctcg tcccacctga ctagaataac ccacagttgt ggaggggaa
82741 gtcacccctt cagataataa gataaatcag agccRaaaac atagttcatt cctgRaatca
82801 aatatagaac gtttctacca acacacattt tcaaagatgg tgttttcagg tttgtatggg
82861 attgtttcac ctttatgaat tagcttttta aaacctgtaa tactttcttg ctgacttcat
82921 catttccttc tggttgcctg gaggggtggg gtggaatgct aataaaaatga atttcagttg
82981 ccgtccctca caatctgaac tatagaagat atttattgtc tcaacttccc tatgagcttt
83041 tctttgcac atgcagcttc atggctcagca gacactaaaa attaaagaaa gtctttctcc
83101 cactttactt gtgtagcaca gacacactga tcaaatatgt tcccagcact tccgaagaaa
83161 ccttatcaca tccacaagag atttctact tgcacttttt ttgataaaca caaccatcat
83221 agcccaacaa aacatcacac agaaatcaaa ttatagtgtc ccataagca tctgctcctc
83281 tatggccttg ggcaaaattt agaatcctcg acatccctag agttaccaca atctctgaaa
83341 gtgaaggagc acccacaag ctcaaggaaat gcattgaaac tcttattact tccaattcca
83401 ttttcaaaaa aagtaaagt gtgtgtatgt gagctgcaca tgggtccagaa tgcctcacca
83461 aatgtattgt tttaaaatgt gtgtacgtcc atgtgtaatt gatatgtgtg gattttgaaa
83521 ggctttttat attttattca aaaaggtaaa cttttcaata tcacaaactt tgctttcaat
83581 tataagccct tccatttttc aattaatgtt ttaggcaagg aatatacatt agtaaaacca
83641 accacaccac ttagggaaaa tgaattagta tggggaaagt gaagaactgg ccatgcagtc
83701 aattactttg gccagcatag atatagttga actaaccagc acaggtgtag acagcctgtt
83761 tggataagggt agcttaagcc ccaatttttt ctgcagtctt tatttttgtc aaatatatga
83821 aaactaccat ctcatctctc ccctgtagct attaccaca tgtatgtgta gtgtcaaaat
83881 aaatggccag agtctctca gggacctccc ttggcacaag tcgcacttcc tcacctctc
83941 acctccagag cctcaggaag tgcaggtcag aaagcagcca gggcagggtg gaggtgatgg
84001 agcgtctgag tgcggcgagc ccagataaaa caacgtttcca acatcggaaa tccaatcatt
84061 cacctacttg tctcctgctc gctaacccca ggcaagtata aaggagatgg aattataaca
84121 ggagttagaa gaatttggat gtgatttcat atattaactc agcaaaattt tttctgaaaa
84181 ggtccagaca gtaaatattt tcagctggca ggccatatgg tctttgtcga acctactcaa
84241 ctgtgccatt atggagtga ggcagccaca gatgatatag aaatgaatgc atggggctgt
84301 gttccaataa agctttcttt atggacactg aaatgtaaat ttcattgcaat ttacatgtgt
84361 tacgaaatat gcttcttttg atttttcaac catttaaaaa agtaaaaaacc attttcttag
84421 ctctggggct gtgttgactg acccctaatt aactgatatg tgggctgcta tccatgaaaa
84481 cctaggcaca gaggaaggca gagctggctt cccagccaag acgggactta ccttgatatg
84541 agctgctggg tccgggacag tctgaatcat gtccttcagt aagccagccc atctaccagc
84601 tgttcagaac Ntgacggcta gaagacaaaa ggaacaacat acataataat aaacaaYtgc

```

```

84661 atttctgtgt tttatgttct agcaggacag gaMacaattc accaatggca aaagaatcat
84721 agctttacat taaacatggt tgcctaaagg catcctctag gtacgtgtgg tccatgaggt
84781 gactagataa ctcacttccc ttccattggg aaaatcactt acaatgagcc caagagaacc
84841 ctagtccgac aggacagaag aatctagctc aagctaacc acatcacatg cagcatccac
84901 acatccttcc acgtggggcag catctaata gggatccatt aaaggaagac gtgggactaa
84961 aacaggggcat acttctctat catactgaga aaacaggact ttgaaatccc accaaaactN
85021 atgcgatctg cacatccttt tcagcttYgt tattaagtcc ttagtaaaca gcacagctac
85081 cattcattga gtacttcagY gccagttcct tgagcgctaa gggctccaca cacatthttt
85141 catttcattc caaccacgac tctgagagct gtcattccca ttgtccagct gtggagctca
85201 agactcataa aggttactga tttgtccagg atcacctggg taataagcga cagaaccaa
85261 cttcaaatca gattaggcta tctgactcca gagcccaaaa aaaatttggt ttgacttaat
85321 tagcMggtat caaccacat tttgaaggga catttttaaa caccgcttaa ataaattaaa
85381 tttaaagatg cctataatcc aggaattttc cagaaataaa tacttcatcc aatatattcc
85441 tttattcaaa tYataaagca gcatgttctg accactgtct gtgccctccc cttccaccga
85501 gccagtctcc aacctccctt tgctgtcaca ggccccaggg ctgacctcta cagatgggct
85561 cagcaggggtg ccttgccctcc tggccacctg tcaggggttg ttgacgtggc cccctctgga
85621 gagcaggggt gagaggagag gggatatctt tcccctcacc ttcccaccac cgacacctgc
85681 cgcccaacct ccctggggcg ttgggttatg ttctgactgc agctggattc tagggggacc
85741 tctcccgta tggggccct ccttccaggc tccagcctcc agtacctggg cccagccag
85801 tctctggtgc tctgcagatc tcagccaagc catcagttct tttttggcac taaaaatgcc
85861 ttttttaRtt tacatthtta gaagccatca cttgcttttt atcacctgta gttttttgtt
85921 tgttttctcc tttacRatgg ctctttgcag taacaaatgc aaaataaaaa taaacaatat
85981 gattacagaW cttgagacat tttcgaaggc tgtctttcaa atttgctact gagcgcatta
86041 ctgtagtgc aagtgaagc attcacagga gtcctcccca cattcacatc tgtcctttct
86101 gacctctcac ggtacaggca caccatttcc aaccaatYg cctctcatga agagcatcta
86161 cctccagatc tgcagtctcc acatctgtct tcagtctccc tggaggcctc ccaagattgg
86221 cggagcttgg ctaccaaga agatgacatg ctgggaacct taggcatttt ttttctataa
86281 ccaaatttct aggtcttgga aaatatgtac ttccccccac cccaccccc aggctaaag
86341 tccctctggg ggatgagagt tactgaaagt acagaggag tgaagtgcag tcctgaaatt
86401 gaaccgggaa gcagatgaag gtgaccaggc tctgtgtgct ctctgtggag aagaggctgg
86461 gagaggatgg ggcctggctg aaggthttct ggagcaYagg aatcctcaac tcccttctc
86521 ctaagagcag caggtgccac aggaaaacac cactctgctc ctgggggtcat tcagcccgga
86581 aggggagcgt ctgcaagcca tcctcacaaa gggaggggct cccactgcac aacctgctc
86641 tggggagcac atggctatth ccgtatgtct ggacattctc tctggactag ttcactccgc
86701 acagttcctc cctgcctgca cacacatgct gacgtcaca ccagggactg aagctcgtcc
86761 ccctccctc aaaccaggc tgacctgtgg ctgctctga cctgcagaac acagcagagg
86821 gaaggthtca ggagtcccag gctcaggcct ttatggaagt gggagcttcc ccttctgccc
86881 tcctgaaacc aagtcccat accctcagca gcacagcaca tggcagagga ccgagtgcct
86941 agtggggcag ccagcaccaa cgccaggccc gggaggggag tgtcctggac agtccagaga
87001 actgactctc agatgaccac ggccctgccc gacatcaggg aggcagcttc cagctgagtc
87061 cagtcagccc acagaatcat gaccaataa aaatgggttg ttgtactaag ctgctaggat
87121 ttggggtagt ttattacaca cacaggctat tgaaacaccc tgtaagtgtc ctagaggcac
87181 ggagaagata gagggtaaat agcttgtttc actgtcacta tggataagta caaagRtgg
87241 tccaacaYtc aactcctcct gtacccatgc tttttgccac ataactttgt gattcttccc
87301 attaaagagg tagaattact tcccaacctt tatttttggg cgccctatat gatctgcttc
87361 agccaacagg cagtagcaga aagacaagta tgacagatcc tagctgaagc ctcaggaggc
87421 aggacatgth cccctthtgc tthctgtaac tthccaccag catgggaaca tggccagatg
87481 catgcgggag gatgagaggt acctgaggca gagtcacca ccccaatcac ccSaccaaga
87541 ctacgtthtga tcatcccata gacaaccaa accccagaca tgggagggag gcaaccagac
87601 cagccgctag ccaagtccaa ccagaatggc caaccacag gctcatggct gaataagtgc
87661 ttactgcttg aagccactga aatttgggga atttgttaca cagcattttt gtgacaatag
87721 attactgaca tacactthtc aatgtacaat cagattaccg agatcttctg taaaattttt
87781 ctagccagtg ataaaaggag actcaaacag ggcatttcaa aggaagccac ttcattccaa
87841 cacagagaca taatattthc actcacctac gagacatgat ctcaaacct aatcctgccc
87901 tcaaaatggg tYtggaact gaaggataac caagaaacct ccaccagaag cctccatggg
87961 attcccagag cccttcccag gagcaactga attctcactt cacatgatgc cctgccagcc
88021 tcccttgat tccaaaaatc aaacatcct tggatatcca agaccgcagc aacatcatag
88081 aagttacagc agccactcgg tctgtaaMca accaagacat aaactaaatg agcaactgtt
88141 tgagtctctt gthtcttatg gggagthtt gagtactcag gttgcatcaa gtataaaatg
88201 acagggaagg gaatagatag agattccaga tgcaacacag tcctgatcct tgagggatcg
88261 agatgggaaa cagatctgtt tcatacagat atgaagcggt cagtcctgag agcaggcagt
88321 tagtggaggt gccagtgag gcgtgtggat atacctagag gaaagagaga gctgattcat
88381 gcagagacaa gaggtgcca ccaaggagcc ttgatgaaca ggactggagg ggactggagg
88441 aaagaggggt aaaggcatga agcagggaac ctaagthtct cccagctctg ccaMattaga
88501 gaccaagggc gtatgagctt ctcacaccgc caccaccaga gtgatcacac accaaaggga
88561 ttcactcagc acgcagcgtg atggcactgc caccctccac accagctcag cgaaaaccca
88621 acggacctaa agaccaggag aataaaagct caaccacct cccctgctc ctcaaccac
88681 acggatctct gactctthtt tthttthtga gacggagtct ctctctgttg cccaggctgg
88741 agtgcagtgg tacgatctcg gctcactgca acctctgct cccgggttca caccattctc
88801 ctgcctcagc ctcccaagta gctgggacta cagccgcca ccaccagcc tggctaattt
88861 tthgtattht tagtagagac gggatttcac cgtgttagcc aggatgggtat cgatctcctg

```



```

88921 acctcttgat ccacccgcct cggcctccca aagcactggg attacaggcg tgagccacca
88981 cgcccggtta attttttgta ttttttagtag agacgggggt tcaccgtgtc ggccagatgg
89041 tctcgatctc ctgacctcgt gatccaccca cgttggcctc ccaaagtgtc gggattacag
89101 gcgtgagcca ccacacctgg ccctctctga ctctttttgc agccatttga gtgcctgttc
89161 ttttttacca tttcagaggt attttatgga ttttttaaag agtacttcta atttactttt
89221 gtgttcctaa tggtcatttc tcaaatatgt agtagttggg aaccaaacia actaaaacca
89281 tactaaaaat ttttagtagt tgggtgatag ttcattgtcac tgtaggaacc tttttatttt
89341 ctattttacc tgcctttgaa cccttgcaga acttcactct atgttgattg aaaatcattt
89401 ctttaataact tgtttcttgc aataaactca tttgctaagg tatatacttc catatgattt
89461 tgtgtttcat gacccagcta tattttatta ttgggtatct taaagaaaca aaaaaggcct
89521 taacaataac agaattctac ttgtgtcact tctttgtttt tgttttcaaa atgccaatgt
89581 cttactaaat agaaacaMac ttgatttgaa ttacgtaagg tctaaccaca taaaaaagat
89641 ggactggtac ccaaggtaga agggaaaata agcattttgt aattatggag gcagtattgc
89701 aaaatggtta agagaaggcc taaatatattg cagggtgtgt gcaagaaat agatggaagt
89761 ttgagacccc tcgacctac ccctcctctc ttctcaaacc caatttgtgt ctgcggtta
89821 ggggatgcat atagtacgt ggacatcccc atccacatgg ccacactcca ttcagcaatg
89881 ctccctgctc atctttcaga ccaggggaaa cacacacaag atcttcccaa gaagatgaac
89941 tccaggaaac aggtgtgtgc agcccaaaaag atgctcagtc aagtttgga aggcactctg
90001 ggtgccccag cacctggggc atgtcctgga atggggatgg gttcagctgg ggagggcagg
90061 aatggggcct agaaggcata ggcaggagcg tgggctgggg gcagtgtctg atatgagcac
90121 agtgcagagc cagatgaggg atggaaatca gatctgccac ttactccttg gaaacctata
90181 aatgatcact ttatcctcca agagccttag ttacacattt gcacaatgag gataWtatta
90241 ctgtagtata ataagaactc catltgcccc tgtctctcgt ttctggcatg gagctcctaa
90301 aactctggga atttcccaag tgatggggagc atcttttgtt ctaagaaggc agcaggttgg
90361 tgagtcccta gatagcttca ggatggggggc taattgcaag aaagagttag tcttgattag
90421 atgctcagaa ccttcagccc catttcccaa cctctcagga gaggagagga gctagaaatt
90481 gagttgatcc ccagtggcca gtgatttaat caatcctgcc tatgtaacaa aatctccata
90541 aaataccctg acgggggttag gacagcttct gggctgggtga gcatattggg atgaagagtg
90601 tgggtgcaacc caatgctaaa gggacagagg cggccaggcg cgggtggctca cgctgtaat
90661 cccagcacct tgggaggccg aggagggtgg atcacgaggt caggagatcg agaccatcct
90721 ggttaacacg gtgaaacccc atctctactg aaaatacaaa agattagccg ggcgtggtgg
90781 tggacgcctg tagtcccagc tgctcaggag gctgaggcag gagaatggcg tgaacccggg
90841 aggaggaggt tgcagtgagc cgagatcgtg ccactgcact ccagcctggg caacagagcg
90901 agactccatc tcacaaaaaa aaaaaaaaag aaaaaagggc agaggctcct gtacttggaa
90961 tccttccaga ccttgccttg tgcacctctt catctggttg ttcatcata tgcttaataa
91021 taaactgtaa tcataagagc atagcgtttt cctgagttct agcaagttgt tgcacctaaa
91081 agggggggtg tgggaacccc caatgttgta gccatgtcag acagagtgtg ggtaacctgg
91141 ggacccaata cttgtaactg gcatctgaag tgaggacggt gttggggagc tcagccctta
91201 aacccatgtg ctaacttccg gtagtcagtg tcagaactga attgaactgt tggacaccca
91261 gttggtatca gtgttgaatg actgggKggg actggcgag acatgatgta tttgggtgtg
91321 ggaaacatga ataaaaaatt tgtaaaacct ccaaacgaYg ttcagcaatt caciaagggtg
91381 tcagtgaag agttggcctg tatctattct aactggctag tatgcaagtt gaaccattgt
91441 ttgattatct cctctgtcta caccatcagg cttttgtgag gattaaacta aattatgcct
91501 cagaaagaaa actctctcaa ggctaggcac ataatacaaa ctaaacaagt ggtaatcatt
91561 ataattaaga aagtaaaaat atttcaaatt gacgattttg atactgtata aaatgttgca
91621 actttttttt ttttgagacg gagtcttgct ctgtcgccca ggctggagcg cagtggcgca
91681 atcttggctc actgcaacct ccacctcccg ggttccactg attctcctgc ctcagcctcc
91741 cgagcagctg ggattacagg cacgtgctac catggctggc taattaaaat gttgcaactt
91801 tttaggaaaa ataactcctca ataaataaat tgctaatttt cataagagcc ctttgtcaac
91861 tgactaaaaa catccttaat ttagaaatgt attttttagt tttaagataa ctagtcatta
91921 agtgaaaaca ttgtaggcaa aatggctcta agcaatttag tattcatagg aatgaatcca
91981 ttcttgaaa gcattggtcg ctgggtgcac ttgtcctgga tgagcagata ttaggcaaatt
92041 cagtctttca ccagcaaacc ctgocataag aactgcacag gcctgattcc tgccaagcac
92101 accaggcccc tgactggggc agaggcctcc cttatggggc aggaagaagg aggcaggag
92161 aaacataggg cccatgattt aaggaggctc tccctctcag gctcatgcaa gtgcaggatc
92221 agtacctaaa ggggagcacc gcccgaaatc ctgtgcccc a gtcaccttaa cccagtccag
92281 ccctggctcc tgcactccaa agctaagcag ggaataccag cgggagacag aagacagcat
92341 gagaaactga atgcatctcc cacatttatc taaaaataag aaMtggact tcttcagtag
92401 gaaatggctY atctttccaa atgaataaaa atacttatag ctatgggttg aattgtatca
92461 attctctccc ccagttcatg cactggagta ctaaccccc agtccctcgg atgtgatgat
92521 agagaggtag ggcctttaca gaggcaatca aattaaagt aggtcattag tgacctaac
92581 caatgtgact gatccactta caaaaaaagg gacaagattt aaagacagac ctgtatagaa
92641 ggacgatggg gtgaagacac agggaaaaga caaaaggagg ctggaacaga ttttctcaa
92701 agccctcaga gggaaacct tgggctgaca ccttgatctt ggacatccag cctccggaac
92761 ggtgagatga tgaatttctg ttgttttaag ctaccagtt catggcagtt tgttacaaca
92821 gcaactggaa aggaaatcac ctctatggag ggacttacga aagtactta actaatgcag
92881 attagaggcc tcacagtcaR ggcattggct caagagccac atccatttta attgtaccat
92941 ttctcactga actctgaccc tgggtcaagg atgtctcagg ctccatggac tactattcct
93001 tccactgatc gaccctggct tcatctggc aaggggaggga ctcatacatt ctgcggcctg
93061 catgagtgtc atgtgagcac ccccataacc ttgatccctg cgggtgcttct ccaggggagc
93121 cctagcattc cagctggcct catgggcatg ccttagagag agggagctga ccctctcctt

```



```

93181 cttcaactgg attttatttt tatttttttg catgttttgt gaatacaaag attcactgcc
93241 tgggtgtgcc ctttgaaaga aggtttcaat tgcattcagg tgaaataacc acaaatgac
93301 tgtaagccaa atgtagtagt atgatagaaa aatggaaata tcgtaaaagc accagtctgt
93361 agacacctag ctctctggtc ctctggaaaa gggagaagag agtagacagt gatggagaaa
93421 agaggggctg tgaagactat agaactgaga aggcagtaat tctaaaatct ccacactgta
93481 gggccaggaa caggcagtgc tgggcaatgg ggcattcttat ctcagggaag tcaaggggtgt
93541 catgtagaac caacataatt catccaagta cagcaaagaa tccagaaatg gtctgtggag
93601 gtttggaacc atgaaaatca aataggaaag atacaaaata tttacatatc cacatttttt
93661 aaaaggggtc ctgactaggc agcataagat tatttgggtt ctgttcattt tacctttagt
93721 tgcccttggc tctgccatct ttttctctct tgagtcattt gtcttgcttt tggccaacac
93781 ggctttctct gggtctccaa agatcctgga ataacctgaa tataagttga agaataattaa
93841 acctattttt gttttcaaatt attaatacca gggatcaact gtacatgtac cgacaaaacc
93901 tatttcttaa acattatttt aaaatatcct aaaaggggaa agaacttaaa tccttccctt
93961 taaaaaaga ggggacaaca ttctctctct ctgagggaag ccagcatta tgaagcaaaa
94021 atcgggagtg aaagcaaggc caagcctaac tggcatgctg aagcacacag atgcttttgc
94081 acagaaaata ttttgaaaat gtttctcttt ccttatagcc ccagctttg gtaataatgg
94141 cttccctaga tcattctgtt agcactttct gctgctcaga acagggtagt gggatttaga
94201 atttagaaaa catcccagga actgtaatta agcaattgtc atagtcccag aaaagaaaca
94261 acccttttac tttgtaaatt ctaggaggat ctgtattttt taaaatctta gaacactaac
94321 tagctaaaaa gatagaaaga aaaaaatctt tcttacaata tgcctgtagc acggctccaa
94381 aatccagtcc ctctctctct tctttttttt tttttttttt ttttttttag atacaggaat
94441 ttcttacaca actttccaag taaaatatct aatccccaaa taatatattt agtaRaattc
94501 ttacaacatg aRaaattgta aatggcatct gtttccgttg aaaatatatt taaattagaa
94561 aacatcttaa gcactgcac aaatcaatat ttgtaatggg cagaattatt tctaaatggg
94621 tccacaggcc agttgacatt ccactctac ttaggaagcc ccagccaac tccacctgaa
94681 gtcttcgaaa cctatgcata gaggcaaatt gccagatgt cacagaaaag catttgttgt
94741 gatacagaaa ataaaacaca ttactggggg aaaaaaatca gggactaaa ccacgtacat
94801 aatatcatcc caatattgca caaagaaaaa aaaataagtg gatgaaataa aagagggaag
94861 gcaggaaagg aaagaggatg acctgagaaa agttatcaaa atgggtaaca gtcattgtct
94921 ttggctttcc agtgtgaaat aggagtctct attttctct ttttaaaata tttttaaatt
94981 tatttatatt ttaaaccaac taataaaaagt aatatatatt taccgtgtac aacattatgt
95041 tttgaaatat atatatatat atatatatat atatatatat atatatatat atatatatat
95101 atatacatgt tggaatggct aaagtaagct aattaacatc tgcattacct cacatactta
95161 tttttttgtg gtgcgaacac ttgaaatcta ctcttagtga ttttcaagaa tataatgcat
95221 tgttattaac tacagtcaat agatcatagg tctattcaag ttcaagtcac agatctcttg
95281 aaattactcc tctgtcttaa ctgaaatttt gtgtcctttg accaacatct cccagttcc
95341 cctacgctca acatcactaa tcatcaagga aatgcaaatc gaaatcatga tgagtgtcat
95401 ctcacacctg ttagaatggc cattatcaaa aagacaagtg ttgggtggga tgtggaaaaa
95461 gggaaactct gccaccgtt ggtgggaacg tagatcagta cagtcattat ggaaaacagg
95521 atggagggtc ctcaaaaaca caaagatcaa ttacaaaaca aaatactata tgttttacaa
95581 atgtactaca actcaatttg gtatgtatta caaatcaaaa tactacatga ttgctggcaa
95641 tcccactctg gagatagatc caaagaaaat ggaaaatgaa atcggtatgt caaagaggta
95701 ccagccctcc caaattcatt acagcattat tcacaacaga caaggtagtg catcaaccta
95761 agtgtccatc aacataaacg ccataaaaga aaagtgggtg acatacacaa tggaaactta
95821 ttcagcattt agaagagaaa tcctgtcatt tgtgacaaca tgaacaaacc tggagaactt
95881 tatgctaaat gaaataagcc aggcacagaa agacacatac tgcattctct cacttataca
95941 tagcatctga aaagttgaac tcctatttcc ttctttatag ttttgtgtat tttccaaatt
96001 ttctaaacca aaaatattca tctttataat cagggggagaa aactaaggaa taatcatttt
96061 ataatcctaa acatgctttt aaagcattta tttcactgta atgtattctt tcccatoca
96121 gtcatacatg ggcccaagga gctggccttc cctgctcggc agcctgatgt tcaaggggat
96181 gggggagggg gacggtgcag tagatcatgc tttgcaaagc tgtgcaaatt tttttttttt
96241 ttttttgaga cggagtctcg ctctgtcgcc caggctggag tgcagtggca cgatcttggc
96301 tcaactgcaac ctccgctctc caggttcaca ccattctctt gcctcagcct cccagtagc
96361 tgggattaca ggcgcccgc accacaccgc gctaattttt gtatttttag agagacgggg
96421 tttcatcgtg ttagccagga cgtgtccac ctcctgacct cgtgatccac ccgctcggc
96481 caaagtgtct ggattacagg cgtgagccac ggcgcccggc caaagctgtg caaatcttga
96541 gttaataaac atgttcccca aatccaaaag ccaatattga ctattgcttg gttaactgtt
96601 ttgcatggat aagtgggtta aggagtattt ggtttccaat ttctgcaaag ggaataaaag
96661 ttttaaaagc gtgaactaag atttcctata ctatgctatt ctatagtagg tttttatgcc
96721 aaaacctcta ctaggctgaa aggataattt gatttatggg tgagacattg ttgggctga
96781 tttaaagccc agagtcaagc ccagagagga ttctcttaaa tatgtgcaat gggatttttt
96841 aaattagcat tatggcgtta ttaatatctt atttatcctg agagcattta cctgacaacg
96901 taaattatgt gtaacacagc tgagaagcca caaaggatcc aaaaagatgt cacgaagtcc
96961 acgaagagaa gctttgccag agaaaggcac actaccagcc gcgtgagctg gcctcatcaa
97021 agcaaaaaag tcagaaaatt atgtaaacca gactcaagaa ctcaaaaata cagtcgtttg
97081 agaacttgga taagagtga aactgctcac ccagctcaa tcacccctgg tccagcaacg
97141 gcagaaagcc aaggtcaagg agtcacatga cctgaagaga cacccccac caccaccacc
97201 accctccaag ccctgcccct ggccagtggg acaaaccaca tgaccctgg gattcagtat
97261 tcagtcaggt tctgtgttct gtatggggag gtagaagaag gcaccagatc atcaggaaat
97321 ctggactgga aatggccaaa gctgaacaca tctgagtacc tgaagggtaa gcttaagggtg
97381 tcaaagcagc catggtgagg cagaaagaac cttgagcttg gggcccaaag tttatgctga

```

```

97441   cccactagca gccacaacaa cctccctcag cctcagtttg ctcatctgaa aactgtgagt
97501   aagaggctct gactccagag aggtggtgca agttcaatga gaaggggttg ctgatggtcc
97561   agatggacag atgcaaagca ctgctttctg tttttgtctt tgttttgata caggattctc
97621   tctgtcatcc aggtctggtg gcagtggtgt caatagctca ctgcagcctg gaccctccct
97681   ggctcaagtg atcctcccac ctccagccacc caactagctc agactatagg aaaaagagtc
97741   atgcaccacc atgcctggct aattttttaa aaaaaNttt tggagacatg agatctcact
97801   attttgtcca ggccaatctc gaactcctgg cctcaagcaa tcctcctctc tcagcctccc
97861   aaagtgcctg gattagaggg gtgagctacc atgccagca aaggcattgt taaattcagg
97921   aatgaatgac caccttggtc cccaaaacac tagacaagag aaccattctc tacgcacaga
97981   tctccctggc caccacgtgt aagcagcagt gaatattcca taggtggaac tggctactgt
98041   gaagaaagaa aactccagaa aagctaccct cactccaaga agtagcctgg accccacgtg
98101   cgtgacagca gcctggggag aaggctccac tcccaccagc aatgccaaagg acagagcagc
98161   agcagccgtc catccccaca gttatggtga acacagccac agagcagcct gctttttcca
98221   tgtatagcca cacacaggtg gcaatggcag cagacgtaac tggctgccct tcctccctta
98281   tggaaagaaa cataattttg cttgggtgtt ctgcctgcc ccacatgacc caYggaggat
98341   gaccagcccc aacaccagtg taaatcctat cactgggcac catctcttct caccacggat
98401   tggtttaggg aagggcacat gatataattc tggtcagtct aacactcggg gaagcgagct
98461   agaggacttc taggaaaagt gttggctgat gaagaaaggc catagagtag tagtcctgtc
98521   tgtgtggcac ttggaactgt gagagccatc

```

[0293] Following are cDNA sequences for *KIAA0296* (SEQ ID NO: 8), *PSMB1* (SEQ ID NO: 9), *TBP* (SEQ ID NO: 10), *PDCD2* (SEQ ID NO: 11 and 12), *ELP3* (SEQ ID NO: 13), *LRCH1* (SEQ ID NO: 14), *SNW1* (SEQ ID NO: 15) and *ERG* (SEQ ID NO: 16 and 17).

KIAA0296 cDNA sequence (SEQ ID NO: 8)

>gi|55643764|ref|XM_510945.1| PREDICTED: Pan troglodytes KIAA0296 gene product (LOC454064), mRNA

```

1   agagctgggg gtagactcct ggctcatgcc agctgcgccc tcttttctct acctccttcc
61  tcttcccccc ttctccttcc cctctttccc ttcctcccca cctcccgga accctggctg
121 agtgtgcgtg tgtgggagcg cgagagcccc ccgacagcca ccccttgggg cgcgcggctg
181 cagttagggg aaggggtccca gtgcgcaggg gcgctctcgt tcgcgggtccc caactgacgc
241 gcccgcggcg ggaaggagag ggggcccgcg gtgcgaggcc ttggcccctc caccagagga
301 aggtgctgcc acgtgtctgc tccttctgaa cctccagggt tctgctacgt tgccccatgg
361 aggacacacc cccctcactc agctgctccg actgtcagcg ccactttccc agcctcccag
421 agctctctcg gcaccgagaa ctgctccatc catctcccaa ccaggacagt gaggaggctg
481 acagcatccc tcggccctac cgttgtcagc agtgtgggcg gggctaccgt caccgccgga
541 gcctgggttaa ccacgtcggg acccagcaga ctggcccttt cccctgtacc acctgtggca
601 aggacttctc caatcccatg gctctcaaga gccatatgag gacacatgct cctgagggcc
661 gccgcaggca caggccccc cgcaccaagg aagccactcc acacctccag ggtgagacgg
721 tgtccactga ctctgggggc caaaggcttg gctctagtga aggctgggaa aaccagacaa
781 aacatacaga agagacacct gactgtgaat ctgtacctga cccagaggca gcttcgggta
841 cgtgggaaga tctgccacc agacaaagag aaggcttggc aagccacca ggtcctgagg
901 atggtgcaga cggctgggga cctccacta actctgccag agccctcct ctccccatcc
961 cagccagcag ccttcttagc aacttggaa acgtatctggc tgaatcagta gtgaacttca
1021 caggggggcca ggagcccacc cagtcctctc ctgctgagga ggagcggcgg tacaaatgta
1081 gtcagtgtgg caagacctac aagcacgccg ggagcctcac caaccaccgc cagagccaca
1141 cgctgggcat ctaccctgtt gccatctgtt tcaaggagtt ctctaacctc atggctctga
1201 agaaccactc tcgactgcat gccagtatc ggccttacca ctgtccccac tgcccccggtg
1261 tcttccggct ccccggggag ctgctggaac accagcagtc ccatgagggt gaaaggcagg
1321 agccacactg ggaggagaaa gggatgccca ccaccaatgg gcacacagat gagagcagcc
1381 aggaccagct cccagtgca cggatgctga atggctctgc ggagctcatc acctctgggg
1441 agctggagga cagtggcctg gaggaatacc ggcctttccg ctgtggggac tgtggccgta
1501 cttaccgcca tgctgggagc ctcatcaacc atcgaaagag ccaccagaca ggtgtctacc
1561 cctgctcact ctgttctaag cagctgttca atgcggctgc cctcaaaaac catgtgcggg
1621 ctcatcacag gccaggcaa ggagtggggg aaaatgggca gccatcagtc ccaccagctc
1681 ccctgctgct ggctgagacc accacaaaag aggaagagga cccaccacc acctggacc
1741 atcggcccta taagtgcagt gagtgtggtc gtgcttaccg ccaccggggg agcctgggtg
1801 accatcgcca cagccatcgg actggagagt accagtgtc actctgtccc cgcaagtacc
1861 ccaatctcat ggccctgcgc aaccacgtgc gggtagattg caaggctgct cgccgaagtg
1921 cagacatcgg ggctgagggt gccccagcc acctcaagg agaaactccc cctgaccag
1981 tggaggcaga ggcagccccg cacacagatc aggacctgt gtgcaaacat gaagaagagg
2041 ccacggacat caccacagca gcagacaaga cagcagcaca tatctgtagc atctgtgggc
2101 tgctctttga agaccctgag agccttgaac gtcattggct gactcatggg gcaggggaaa
2161 aggaaaatag cagaacagag accacaatgt cacctcctag ggcctttgcc tgccgagact
2221 gtggaaagag ctatcgccac tcaggcagcc ttatcaacca caggcagacc caccagacag
2281 gagacttcag ttgtggggcc tgtgccaaag acttccacac catggctgcc atgaagaacc

```


2341 acttgccgccc gcacagtcgg cggcggagca ggcggcatcg gaagcgggct ggcgggtgcca
 2401 gcgggtgggag agaagccaaa ctccctggcag cggagagctg gacccgggag ctagaagaca
 2461 atgaaggcct ggagtctccc caagaccctt caggggaaag tcctcatggg gctgaaggca
 2521 acctggaaag tgatggggac tgtttgcagg ctgaatctga aggggacaaa tgtgggcttg
 2581 agaggggatga gacccatttc cagggtgata aagagagtgg aggcactggg gaaggactga
 2641 aaaggaagga tgccagttaa cttgacaact tggacatccc aggtgaggaa ggtgggtggca
 2701 ctactttctg cgatagcctc actgggggtg atgaagacca gaagccagcc actggccaac
 2761 ccaactcctc ttcccactct gccaatgctg tcaactggctg gcaggctggg gccgctcaca
 2821 catgctctga ctgtgggcat tctttccccc atgccactgg cctgctgagc cacaggccct
 2881 gccaccacc aggcatctat cagtgtctccc tctgcccga ggagtttgac tctctgctg
 2941 ccctccgcag ccacttccag aaccataggc ctggggaggc gacctcagca cagcctttcc
 3001 tctgctgcct ctgcggcctg atcttccctg ggcgggctgg ctacaggctt caccggcgcc
 3061 agggccacag ctccctctggc atgactgagg gctcagagga ggagggggaa gaggaaggag
 3121 tggcagaggc agcccctgca cgcagtcac cactgcagct ctcggaagca gagctgctga
 3181 atcagctgca gcgggagggtg gaagcgctgg acagtgcagg gtatgggtcac atctgtggct
 3241 gctgtgggtca gacctacgat gacctgggga gcctggagcg tcaccaccaa agtcagagtt
 3301 ctgggactac tgcagacaag gctcccagcc ccttgggagt ggcagggtgat gccatggaga
 3361 tggtcgtgga cagtgtcttg gaggacatag tgaattctgt ctctggagag ggtggagatg
 3421 ccaagtctca agaggagca ggcacccctc tgggagacag cctctgcac cagggtgggg
 3481 aaagtttgct ggaggctcag ccccgccctc tccgctgcaa ccagtgtggc aagacctatc
 3541 gccatggggg cagcctgggtg aaccaccgca agatccacca gactggagac tttctctgcc
 3601 ctgtctgctc ccgctgctac cccaacctgg ctgcctaccg taatcatctg cggaaaccac
 3661 ctgctgcaa aggtctctgag cccaggttg ggcctatccc agaggcagca ggtagcagtg
 3721 agccgcagggt tgggcccctc ccagaaggag gcagcaacaa gcccagcac atggcagagg
 3781 aggggcccgg gcaagcagaa gtcgagaagc tccaggaaga acttaaagtg gagcccctgg
 3841 aggaagtggc cagggtgaaa gaagagggtg gggaggagac cactgtgaag ggggaggaga
 3901 tagagcccag gctggagacc gccgagaagg gctgccagac tgaagccagc tctgagcggc
 3961 ccttcagctg cgagggtgtg ggccgatcct acaagcacgc cggcagcctc atcaaccacc
 4021 ggcagagcca ccagaccggc cactttggct gtcaggcctg ctccaagggc ttctcaaacc
 4081 tcatgtccct caagaaccac cggcgcatcc atgcagatcc ccgacgtttc cgctgcagcg
 4141 agtgtgggaa ggccttccgc ctgcggaac agctggccag ccaccagcgg gtccacatgg
 4201 aacggcgtgg ggggtggggc acccgaaagg cgaactcggg agatcggccc ttccgctgtg
 4261 ggcagtgcgg gcggacctat cgcacgccc gcagcctcct gaaccaccgg cgcagccacg
 4321 agacgggcca gtacagctgc cccacctgcc ccaagacctc ctccaaccgc atggccctga
 4381 aggaccacca gaggtgtcac tcagagaatc ggcggcgacg ggctggacgg tccaggcgca
 4441 cagctgtgcg ttgcgccctc tgtggccgca gcttccctgg ccggggatct ttggagcggc
 4501 acctgcggga gcatgagaag acagaaaggg agccagccaa tggccaggga ggcctggatg
 4561 gcacagcggc cagtgaggcg aacctggctg gcagccaggg actagagacc caattgggtg
 4621 gtgctgagcc agtaccacac ttggaggatg gagtcccaag gccaggggag cgcagtcaga
 4681 gcccctcag ggcagcaagc tcagaagccc cagagccact gtcctggggg gcaggggaagg
 4741 caggtgggtg gccggtaggt gggggactgg ggaatcatag tggaggctgg gttcctcagt
 4801 tcctaactag gtcagaggag ccagaggaca gtgtccacag gagtcccttg cacgctagtg
 4861 actgccagct caatggacct aatctgagtc acatggatag ctgggacaac agagacaaca
 4921 gctctcagct gcagccaggg agccactcct cctcttgacg ccagtgtggc aagacttact
 4981 gccagtgcgg cagcctcttg aaccacaaca cccacaagac agaccgacac tattgcctgc
 5041 tctgctccaa ggagtcttta aatcctgttg ccacaagag ccacagccac aaccacatag
 5101 acgcccagac ctttgctgtg cctgactgtg gcaaagcctt tgagtccac caggaactgg
 5161 ccagccacct gcaggctcat gccgggggcc acagccagggt gccagcccag atggaggagg
 5221 ccagagatcc caaagccggg actggggagg accagggtgt tctccctggg caagggaag
 5281 cccgggaggc cccatcagaa acccccagag acccaggaga gagtgtggag agagccaggg
 5341 gaggacaagc ggtgacgtcc atggcggctg aggacaagga gcggcccttc cgctgcaccc
 5401 agtgcgggag ctccctaccgc catgctggca gcctgctgaa ccaccagaag gccacacca
 5461 cagggttata cccgtgctcc ctctgtccca aacttctccc taacctgctg tctcttaaga
 5521 accacagcag gacccacacg gaccccaagc gccactgctg cagcatctgt ggcaaggcct
 5581 ttcggacagc tgcccggctg gagggccacg ggcgggtcca tgcaccccg gaggggcctt
 5641 tcacctgccc ccattgtccc cgccacttcc gcccgccgaat cagcttcgtg cagcaccagc
 5701 agcagcacca ggaggagtgg acggtggccg gctccgtcca ggcccagctg cagcaacaac
 5761 agtcattagc ccgtgtcaca tccctgatca gagggcatct ccgtggggaa tgcctccac
 5821 ccagcactgc tggaaagcgc agctgccagg gagtggggcg gccggttccc tcagcaggac
 5881 ctgggctggc ctctccacct cctctagtag aggcggaccc attccatcta gtggccaccg
 5941 aggctgggca gctcaccac agcactggta cacaccatcc ctggcagaat agggctgccc
 6001 tcaccccccag gagctgcatg cagccggctg caggccctag gcccaggag ggtcacgggc
 6061 actgtctgga gggagctgat gcctgtggag caagggaag ctggctgccc cggcctgcag
 6121 gttggatgga cagcagccct ggccctgtgc ccacctacct gctcctgggc gggcccgctc
 6181 cagaaccag ccgcgtccc catcaggcag gtgggtggccc cactcctccg atcaaggacc
 6241 aggcggacga ggcacagtag ggcctgcgtg agagccggaa gctggatgac cacaaggatg
 6301 tgggtgacct cttggcagag ggcctgcgtg agagccggaa gcacatagag gatgaaaagc
 6361 tcgtccgcta cttcttggac aagacgctga cttcgaggct tggaaatccg atgttggcca
 6421 cgcacacct ggcgctgcat gaggacaagc ctgactttgt cggcatcatc tgtactcgtc
 6481 tctcaccaaa gaagattatt gagaagtggg tggactttgc cagacgcctg tgtgagcaca
 6541 agtatggcaa tgcgccccgt gtccgcatca atggccatgt ggctgcccgg ttccccttca


```

6601 tccctatgcc actggactac atcctgccgg agctgctcaa gaatgccatg agagccacaa
6661 tggagagtca cctagacact ccctacaatg tcccagatgt ggtcatcacc atcgccaaca
6721 atgatgtcga tctgatcatc aggatctcag accgtgggtgg aggaatcgct caciaagatc
6781 tggaccgggt catggactac cacttcacta ctgctgaggc cagcacacag gacccccgga
6841 tcagccccct ctttggccat ctggacatgc atagtggcgc ccagtcagga cccatgcacg
6901 gctttggctt cgggttgccc acgtcacggg cctacgcgga gtacctcggg gggctctctg
6961 agctgcagtc cctgcagggc attggcacgg acgtctacct gcggctccgc cacatcgatg
7021 gccgggagga aagcttcagg atctgacccc acagcctttg gcctgctcac ccgaccagcc
7081 tgggcccgcg tccctgcagg acctcccggg tcaggcaggg cggccccctg ctccacacac
7141 tgctgcatct tgggtctcag ggccccagac agatggactt acatggagct gggcactgcc
7201 ccgcctcaac aggggtccatt gcctcctcgc ctccagacct tggagtgggg aagtgggcac
7261 cctgaggcct ccagcaccag ttccgtcatt ctcgttcctg ggaaccccc actctgacct
7321 gttgtta

```

PSMB1 cDNA sequence (SEQ ID NO: 9)

NM_002793 Homo sapiens proteasome (prosome, macropain) subunit, beta type, 1 (PSMB1), mRNA

```

1 aaggcagcca tctcgccgtg agacagcaag tgtcgcgag ccgtgcatg ttgtcctcta
61 cagccatgta ttcggctcct ggcagagact tggggatgga accgcacaga gccgcgggccc
121 ctttgcagct gcgattttcg ccctacgttt tcaacggagg tactatactg gcaattgctg
181 gagaagatth tgcaattgtt gcttctgata ctcgattgag tgaagggttt tcaattcata
241 cgcgggatag ccccaaattg tacaatttaa cagacaaaac agtcattgga tgcagcgggt
301 ttcattggaga ctgtcttacg ctgacaaaga ttattgaagc aagactaaag atgtataagc
361 attccaataa taaggccatg actacggggg caattgctgc aatgctgtct acaatcctgt
421 attcaaggcg cttctttcca tactatgttt acaacatcat cggaggactt gatgaagaag
481 gaaagggggc tgtatacagc tttgatccag tagggcttta ccagagagac tccttcaagg
541 ctggaggctc agcaagtgcc atgctacagc ccctgcttga caaccagggt ggttttaaga
601 acatgcagaa tgtggagcat gttccgctgt ccttggacag agccatgcgg ctgggtgaaag
661 atgtcttcat ttctgcggct gagagagatg tgtacactgg ggacgcactc cggatctgca
721 tagtgaccaa agagggcatc agggaggaaa ctgtttcctt aaggaaggac tgatctgtgt
781 gctcttatca ccaatcagtt cagacctggt tgattttgta ctttggaact gtaccttga
841 tggttttgtt tattaaga gaaacctgaa gt

```

TBP cDNA sequence (SEQ ID NO: 10)

NM_003194 Homo sapiens TATA box binding protein (TBP), mRNA

```

1 ggttcgctgt ggccggcgcc tgggcccggc gctgtttaac ttcgcttccg ctggcccata
61 gtgatctttg cagtgaccca gcagcatcac tgtttcttgg cgtgtgaaga taacccaagg
121 aattgaggaa gttgctgaga agagtgtgct ggagatgctc taggaaaaaa ttgaatagt
181 agacgagttc cagcgcaagg gtttctggtt tgccaagaag aaagtgaaca tcatggatca
241 gaacaacagc ctgccacctt acgctcaggg cttggcctcc cctcagggtg ccatgactcc
301 cggaatccct atcttttagtc caatgatgcc ttatggcact ggactgacct cacagcctat
361 tcagaacacc aatagtctgt ctattttgga agagcaacaa aggcagcagc agcaacaaca
421 acagcagcag cagcagcagc agcagcagca gcagcagcag cagcagcagc agcagcagca
481 gcagcagcag cagcagcagc agcagcagca gcaacaggca gtggcagctg cagccgttca
541 gcagtcaacg tcccagcagg caacacaggg aacctcaggc caggcaccac agctcttcca
601 ctcacagact ctcaactg cacccttgcc gggcaccact ccactgtatc cctcccccat
661 gactcccatg acccccatca ctctgcccac gccagcttcg gagagtctcg ggattgtacc
721 gcagctgcaa aatattgtat ccacagtga tcttggttgt aaacttgacc taaagaccat
781 tgcacttcgt gcccgaaacg ccgaatataa tccaagcgg tttgctgcgg taatcatgag
841 gataagagag ccacgaacca cggcactgat ttccagttct gggaaaatgg tgtgcacagg
901 agccaagagt gaagaacagt ccagactggc agcaagaaaa tatgctagag ttgtacagaa
961 gttgggtttt ccagctaagt tcttggactt caagattcag aatatgggtg ggagctgtga
1021 tgtgaagttt cctataaggt tagaaggcct tgtgctcacc caccaacaat ttagtagtta
1081 tgagccagag ttatttcctg gtttaatact cagaatgatc aaaccagaa ttgttctcct
1141 tatttttgtt tctggaaaag ttgtattaac aggtgctaaa gtcagagcag aaatttatga
1201 agcatttgaa aacatctacc ctattctaaa gggattcagg aagacgacgt aatggctctc
1261 atgtaccctt gcctccccc ccccttctt tttttttttt taaacaaatc agtttgtttt
1321 ggtaccctta aatgggtggg ttgtgagaag atggatgttg agttgcaggg tgtggcacca
1381 ggtgatgccc ttctgtaagt gccaccgcg ggatgccggg aaggggcatt atttgtgcac
1441 tgagaacacc gcgcagcgtg actgtgagtt gctcataccg tgctgctatc tgggcagcgc
1501 tgcccattha tttatatgta gattttaaac actgctgttg acaagtggg ttgagggaga
1561 aaactttaag tgtaaaagcc acctctataa ttgattggac tttttaattt taatgttttt
1621 ccccatgaac cacagttttt atatttctac cagaaaagta aaaatctttt ttaaaagtgt
1681 tgtttttcta atttataact cctagggggt atttctgtgc cagacacatt ccacctctcc
1741 agtattgcag gacagaatat atgtgttaat gaaaatgaat ggctgtacat atttttttct

```

1801 ttcttcagag tactctgtac aataaatgca gtttataaaa gtgttaaaaa aaaaaaaaaa
 1861 aaaaaaa

PDCD2 cDNA sequence 1 (SEQ ID NO: 11)

NM_002598 Homo sapiens programmed cell death 2 (*PDCD2*), transcript variant 1, mRNA

```

1 tcttgcccttc cggccccggcg cccgattttcc gccttccgac ccagctgtgg gctgcgcccc
61 acgccagccc gcgccccgca tggctgccgc cggggccagg cctgtggagc tgggcttcgc
121 cgagtcggcg ccggcgtggc gactgcgcag cgagcagttc cccagcaagg tgggcgggcg
181 gccggcatgg ctgggcgcgg ccgggctgcc ggggccccag gccctggcct gcgagctgtg
241 cggccgcccc ctctccttcc tgctgcaggt gtatgcgcgc ctgcctggcc gcccgacgc
301 ctccaccgc tgcattctcc tcttctgctg ccgcgagcag ccgtgctgtg ccggcctgcg
361 agtttttagg aatcaactac ccaggaaaaa cgatttttac tcatatgagc caccttctga
421 gaatcctccc ccagaaacag gagaatcagt gtgtctccag ctttaagtctg gtgctcatct
481 ctgcagggtt tgtggctggt taggccccaa aacgtgctcc agatgccaca aagcatatta
541 ctgcagcaag gagcatcaga ccctagactg gagattggga cataagcagg cttgtgcaca
601 accagatcat ctggaccata taattccaga ccacaacttc ctttttccag aatttgaaat
661 tgtaatagaa acagaagatg agattatgcc tgaggttgtg gaaaaggaag attactcaga
721 gattataggg agcatgggtg aagcacttga ggaagaactg gattccatgg caaaacatga
781 atccagggaa gataaaatth ttcagaagtt taaaactcag atagcccttg aaccagaaca
841 gattcttaga tatggcagag gtattgcccc catctggatt tctggtgaaa atattcctca
901 agaaaaggat attccagatt gccctgtgtg tgccaagaga atattggaat tccagggtcat
961 gcctcagctc ctaaaactacc tgaaggctga cagactgggc aagagcattg actggggcat
1021 cctggctgtc ttcacotgtg ctgagagctg cagcttgggt actggctata cagaagaatt
1081 tgtgtggaag caggatgtaa cagatacacc gtaaaggcat cttaaagcct tgaaaaatgt
1141 taataatctt ttataccttg caattccatt tctgggattt taccctaagg aaatacttat
1201 accaaaaata gaggtgcaga gatgttgaca gattgcttac acagtgtcta cttattagtg
1261 aaacaaaagt gtccagtgc agggaaattaa ataaattttg gtacatccac a

```

PDCD2 cDNA sequence 2 (SEQ ID NO: 12)

NM_144781 Homo sapiens programmed cell death 2 (*PDCD2*), transcript variant 2, mRNA

```

1 tcttgcccttc cggccccggcg cccgattttcc gccttccgac ccagctgtgg gctgcgcccc
61 acgccagccc gcgccccgca tggctgccgc cggggccagg cctgtggagc tgggcttcgc
121 cgagtcggcg ccggcgtggc gactgcgcag cgagcagttc cccagcaagg tgggcgggcg
181 gccggcatgg ctgggcgcgg ccgggctgcc ggggccccag gccctggcct gcgagctgtg
241 cggccgcccc ctctccttcc tgctgcaggt gtatgcgcgc ctgcctggcc gcccgacgc
301 ctccaccgc tgcattctcc tcttctgctg ccgcgagcag ccgtgctgtg ccggcctgcg
361 agtttttagg aatcaactac ccaggaaaaa cgatttttac tcatatgagc caccttctga
421 gaatcctccc ccagaaacag gagaatcagt gtgtctccag ctttaagtctg gtgctcatct
481 ctgcagggtt tgtggctggt taggccccaa aacgtgctcc agatgccaca aagcatatta
541 ctgcagcaag gagcatcaga ccctagactg gagattggga cataagcagg cttgtgcaca
601 accagatcat ctggaccata taattccaga ccacaacttc ctttttccag aatttgaaat
661 tgtaatagaa acagaagatg agattatgcc tgaggttgtg gaaaaggaag attactcaga
721 gattataggg agcatgggtg agcagtttca ggacttcatt cattaagtgg ttaaacataa
781 tacttggaag aaagggtccc atgtgcctag aagagaggta ctgagaggaa gactcacttt
841 ggaggctgta gcatacaatt ttcagatatt gcctcaggta aaaatatact tcctggactt
901 tgttttctga cacataagag gtgtgttctg ctccctgtaa agacaagggt gggatatccag
961 atgggtcccat gagtagggct gcacaagatg ctggaggctt ggtaagttcc tctgggtcgc
1021 agatcggttt ctcggttcgg gatagtgtga gtgcctagca cagtgtcggg cacgcagaag
1081 ggccccttaa aagtttctct ttcattctggc cagttttaga tacacaattt tgtcagttta
1141 cttacagtgc atactcttgg gtagtacttg tgctgaccaa gtatcttaga ggcttatttt
1201 attatagtag ccaacattta tccagcactt acctatata aagggtgtgt tgtgcatgag
1261 ctcatataaa tcgtgacagc agaccaatga gtgagaaact gccccatttt gaaggtaggg
1321 aaattgaggt tctgggtata actttctttg gtcacataat attaaatttt acaatttgag
1381 ccttgagcca tacacaaaac caccacaaaa ttagatttat agactcaaaa tgaaaacatc
1441 agcttactgg tttgtagtct ataccagtca tacattccaa aacatgtttt gactcttact
1501 ctgtgcctga ccttgtgctt gataacaggg atataatggg aagcaacact ccagtgggtca
1561 gatgctcaca gtcttatgga ggagcccaa taatatctgg ggaagttaaa gtccatataa
1621 tgactgataa gagtacaata cagggtgccat gggaacacgt gacatcactg aagactgcct
1681 ggaaggggccc gcgcgtgtgt tcatgcctat acgataaaca tgatacataa tgaaaatgct
1741 tatcttttag agaaaggaga gcctagagta gcaggatcaa ggatgaaagc tggacttcaa
1801 atatgccttg ttagtgtaaa tgtgactgtg gaactgtatg agtattttta gattatggag
1861 taaagtaagt tttaaaaagc agtccctaata catcaaaagt aaaaaactct tgatgtagtc
1921 atataaccac actaagaact cttccagggtg acttcaaaac ataggacagt acatctctag
1981 tagaatatgc cctgagaatg aaaagaatgt aacagtgtta gtattttgaa taaacatgtt

```

2041 attactaaaa aaaaaaaaaa aaaaaa

ELP3 cDNA sequence (SEQ ID NO: 13)

NM_018091 Homo sapiens elongation protein 3 homolog (S. cerevisiae) (ELP3), mRNA

```

1 gcagaaatga ggcagaagcg gaaaggagat ctcagccctg ctgagctgat gatgctgact
61 ataggagatg ttattaaaca actgattgaa gcccacgagc aggggaaaga catcgatcta
121 aataaggtga aaaccaagac agctgccaaa tatggccttt ctgccagacc ccgcctggtg
181 gatatcattg ctgccgtccc tcctcagtat cgcaaggctc tgatgcccaa gttaaaggcg
241 aaacccatca gaactgctag tgggattgct gtcgtggctg tgatgtgcaa accccacaga
301 tgtccacaca tcagttttac aggaaatata tgtgtatact gccctggtgg acctgattct
361 gattttgagt attccaccca gtcttacact ggctatgagc caacctccat gagagctatc
421 cgtgccagat atgacccttt cctacagaca agacaccgaa tagaacagtt aaaacaactt
481 ggtcatagtg tggataaagt ggagtttatt gtgatgggtg gaacgtttat ggcccttcca
541 gaagaataca gagattatth tattcgaaat ttacatgatg ccttatcagg acatacttcc
601 aacaatatth acgaggcagt caagtattct gagagaagcc tcacaaagtg tattggaatt
661 actattgaaa ccagaccaga ttactgcatg aagcgacatt taagtgacat gttgacctat
721 ggctgcacaa ggctggagat tggggtgcag agtgtttatg aagatgtggc tagagacacc
781 aacagggggc acactgtgaa ggcagtgtgt gagtcatttc acctggccaa agattccggt
841 tttaaagtgg tggcccatat gatgcctgac ctgcccacac tgggactaga aagagacatt
901 gaacagttca cagagttttt tgagaaccct gcttttcgtc ccgatgggct gaaactctat
961 cctaccctgg tgattcgtgg gaccgggctt tatgagcttt ggaaatcagg aagatataag
1021 agttactctc ctagtgcact ggttgaattg gtggctcgga tcctagccct cgtgcctcca
1081 tggactcgag tgtaccgagt acagagggat attccaatgc ctttagttag ctcaggagta
1141 gagcatggta acctgagaga gctggcactt gcaagaatga aagacctcgg aatacagtg
1201 cgagatgtga gaaccagaga agttggaatc caagaaattc atcacaagt acggccatac
1261 caggttgaat tggtaaggag agattatggt gcaaatgggt gctgggaaac attcttgta
1321 tacgaagacc cagatcaaga catttttgatt ggccctctac gattacgcaa gtgttcagaa
1381 gaaactttcc gtthtcgaatt ggggtggagg gtctccatag tacgagagct gcatgtgtat
1441 gggagtgtgg tccctgtgag cagccgggat cctactaaat ttcagcatca gggatttggc
1501 atgctgctga tggaggaagc agaaagaata gctagagaag aacatgggtc tgggaaaatc
1561 gctgtgatat caggggtcgg caccaggaat tattatagaa agatcggcta cagattacaa
1621 ggcccgta ca tggtaagat gctgaaataa tggccacacc agtccactct tctgcagtat
1681 cctccctggc agaacacgga gaatcaggat ttcttaataa ctcaacagag aggctgagca
1741 gagcaaatgg ggggcttcac cctcatcccg cagctgcaga gactggaaac tgccttcaag
1801 gccacggctg gtcactctgt gaccacaccc cagatccgcc ctctcctgcg tgcaccccaa
1861 aaaatcactt gcgtttttga ggcttaaatc atctatccag tttctacatt ttgcatgagg
1921 cctgcaggtg gcctatthtg actcagacgg tgaaaaaagc aaattaactc atttggacac
1981 cataactcat gcaataaaac tgattgtcat tcgaggagca aacttaagag tagtttattt
2041 atataccctg gggacagaaa gtcagggtga aacaggaaaa ccaccagact ctaatctcag
2101 ccctthaacg acatacgc at tggagcgcaa gttaggaaaa tgagctthtg ttttcatgga
2161 aatcattctg attacagtgc tgatgtthtg aaataaatag cagtgtgact gggaaagagg
2221 aattgcagtt gtgggggtgt gagcctggca gcagccagcc agcagcctct cccaggcggg
2281 agtctaccat ccgagacggc gatgacaaag agcttcattc cacattcttt gttatctcta
2341 cttcccaccc tcttggcaac tacagagcag tgtgggcagc cccaagtgtg gtccccagag
2401 agcgtthtgg tttcctgtct gtctatcctg agcgggtgga gtctcaggtt gtgtgcccct
2461 aaatcaagat ttgctthcac agaagccatt acttgcaatt tttttttttt tttctgagaa
2521 agtctcgctg tgtcaccagg gctggagtgc agtggcgcaa tctcactgca tcctccgcct
2581 cccgggttca agcgattctc ccgcctcagc ctctgagta gctgggatta caggcacccg
2641 ccgctgctaa tttttgtatt tttagtagag atgggggttt caccatattg gtcaggctgg
2701 tctcgaactc ctgacctcag gtgatcaacc caccttggcc tccctaaatg ccgggattac
2761 aggcagagc caccgctccc agcctthgat tttthtaagg ggattthtgg tgttataaat
2821 ggagaaagg aagagttcaa gttcaaccgg tgtgtgaaag caaaacaatg gaaaacagga
2881 ttggctthct caaaggctcc tcttgtagaa ctgcctctth gaaatttcga ggtaatctac
2941 tttggagact ctgcctggag agggtcagtt cctaagttaa aagcatcgct taaccttggc
3001 tcctgtggca ttttaciaaag gtttaaagga attgattcct ctgaaagggc ctgaaaataa
3061 aaagtcttta acatataaaa aaaaaaaaaa aaaaaa

```

LRCH1 cDNA sequence (SEQ ID NO: 14)

NM_015116 Homo sapiens calponin homology (CH) domain containing 1 (CHDC1), mRNA

```

1 ccgcagtcct tagcttcccc gggacaggaa accttcaaga ccgagctgcc acggccgcct
61 ccccgcccg ccccatctt acgcgcctgc ccacaccctc ctcccctcct tccagcgcct
121 ttcgggtggag cactgcggca ctcagcccga gctgccgttt tcccctcgcg gggaaagctg
181 tgaccccccc gcaggagcgg cggggcgggg tggggggggc cgggagaaga tggcgacgcc
241 gggaaagcga ccccaacctt tcgtcccggc cctthtcggta gctactctgc acccacttca
301 tcatccccac caccaccacc accaccatca gcaccacgga ggaaccggcg ccccgggcgg
361 ggcgggtggt ggcggcggtg gcagcggggg cttcaacctg cccttgaacc ggggtctgga

```



```

421 gcgcgcgctt gaggaggcgg ccaactccgg ggggctgaac ctgagcgcca ggaaattgaa
481 ggaatttccc cgtaccgcag cccccgggca tgacctctcg gacacgggtg aggagacctt
541 atctaaaaac agactgggtg aagttccaat ggaattgtgc cattttgtat cactggaaat
601 tcttaattctg tatcacaact gtatcagagt cattcctgag gccatcggtt atctgcagat
661 gctgacttac ctgaacttga gtcgaaatca gctgtccgcc ctgcctgcct gcctgtgtgg
721 tctgcctctc aaagtcttaa tcgcaagtaa caacaaactt ggatcattac cagaagagat
781 aggtcagctc aaacagttaa tggagctgga tgtcagctgc aacgagatca cagcgttgcc
841 ccagcagata ggtcagttga aatctctacg agaactgaat gtcagaagaa attaccttaa
901 agttttacca caagaactag tagatcttcc cttggtaaag tttgactttt cctgcaacaa
961 agtgctcgtg attccaattt gtttttagaga gatgaagcag ctgcaagtgt tactacttga
1021 gaataaccct ctgcagtctc ctccagcaca gatttgcaca aaggggcaaag ttcacatatt
1081 taagtatctg agcatacaag catgccagat taagacagct gactcccttt atctccacac
1141 catggagagg ccacattttac accagcacgt ggaagatggc aagaaggatt ctgattcggg
1201 agttggaagt gataatggag ataagcgatt atctgccacc gagccttctg acgaagacac
1261 tgtagcctc aatgtgccaa tgtcaaacat catggaagaa gaacagatca tcaaggagga
1321 ctcgtgccat cgccttagcc ccgttaaagg ggaatttcat caggaatttc aaccggagcc
1381 ttcccttttg ggtgacagca ccaactcagg agaagaaaga gaccagttta ctgatagagc
1441 agatggtctc cattcgggat ttatgaacta taaggcaagg gcagaagact gtgaagagct
1501 gttacggata gaagaggatg tgcactggca aactgagggc ataataagtt catccaaaga
1561 tcaggacatg gatatagcaa tgatcgagca gctgagagaa gcagtagatt tgctgcaaga
1621 tcccaatgga ttaagcacag atattacaga gagaagtgtt ttaaacctat atcctatggg
1681 atcagcagaa gccttagaat tacaagattc tgcactgaat ggtcaaatac agctggagac
1741 atctccggtg tgtgaggtgc aaagtgatct aacattacag agtaacggga gccagtattc
1801 tccaaatgag attagagaga actcccctgc agtctctcct accacaaaca gcacagctcc
1861 atttggcctg aagcctcgat cagtgtttct aagacctcag agaaatttgg aatctataga
1921 cccgcagttt acaatccgga ggaaaatgga gcagatgaga gaagagaaag agctggtgga
1981 acaacttcgt gagagcattg agatgagatt gaaggtcagt ctacacgaag acctgggggc
2041 agccctcatg gatggtgtcg tcctctgcca tctggtcaac cacatccgcc cacggtcggg
2101 tgcaagcatc catgtcccat caccagcggg tcccaaactt agcatggcca aatgcagaag
2161 aaatgtggaa aacttttttg aagcgtgccc aaaattagga gtaccagagg ctgacctctg
2221 ctctccgtgt gacatcctgc agttggattt tcgtcacatt cgaaagactg ttgacactct
2281 gctggcactc ggggagaaag cccaccacc aacttctgcc ctccgctcca gggaccttat
2341 aggcttctgt cttgtccata ttctctttat agtctggtc tatatcactt accactggaa
2401 tgctctgtcc gcataacgtc tgcacgtgca tccaaacgct gtgctctgtc gccctcaacc
2461 tttgcagggt ccttcctacc tttgagcctt tgcttgcaa acttccatcc ctgtcatgtc
2521 ttcagttatc tctcgagtgt tgaagctgaa cagtagcaaa tcagattttc cagaagcaca
2581 aactttgtag aatacagttt agtataattc ctctcactta ctgaaataca acgacgacga
2641 ctgcaaagtg tatgcacacc gcatgcttcc tcatccacat agtgccagca gcagtgccac
2701 gcagttcctc ctctccctcc cggtagctg ctgccttggg cagaggggag gagaattcca
2761 ggacaagagt gtcaaggaca gggatttagc atatggaagt ctttcctttg ggtcagtatt
2821 gaactagaat tctaattcgg gactgggcaa ttgagctgta taggggccac cttgcaggga
2881 ggacagaaaa ctaacatttt ggcccaactt gatctataca aaactttaat aataccacta
2941 ctgaccaagt tggacgtgta cacgtactca cactgccttg atggccattc gattggattc
3001 ctcccaaatt tcctaaaaag ggagccgcga agggcgctgg gcagtgtggc cgccaacttc
3061 caccocggca agccctctct tcctatgcag aaggcgctc caggggaagg agtgtcgttg
3121 ctgttagagc ctcacgtgga ggagtcactt aaacaccagt tttttactgc ttaattcctt
3181 gttagggtct ctcttgaggg tcttagaaaa gcgttttcca gagagatttc tatttttgaa
3241 caatggaacg gatcactgct tttttgccac atcacatagt aactgccggg ccagaatgtg
3301 acggattcga ctctattcat tttcaaataa agccatgagc cgtggaacat tcttggctct
3361 ggtgcttggg ttatgatggc aggagtcaag aagaagatta ctttcattct agaagaatgt
3421 agtttctcta attatttgaa atgttcattt agcctttgat tttcactgat attaactagc
3481 aaactgcttt aagtcagctc aaaggattat atagtaacta tatctgcatt tggagcaatg
3541 tgatcagttt gcatttaaaa ggaaaaaaa gaattttatc ttagccagaa tgtccctgga
3601 ttcaggggtg tctttgtata atatgagagg gccttgttcc aaggtcaagg cagcctcctt
3661 attttacatg ctgtttgcca aatcttgttt cttagcttgg ggagatgatg gacttagctt
3721 cctcaagata aatttctagt ttattaagat gcaaacagct ctcatagatg gctactacga
3781 agaaaatctt atttttctga acattttcat gaatccaggg gacttgaaaa tatggaagac
3841 ccacatagtt agaagaatat atttataaag attccttgct gctaagtcag atcagatttg
3901 ctaacaggaa gcattcttta catgacagta tcttgagtta tgtgagtttt ttttcctcct
3961 gacttttgtg tgattggtga aatgcagggt atgtggaagt tatctaatta acctcagttg
4021 tatatgaata acccacagat gtactgaatt acttttgggt ctatcttgta ctcttcaatc
4081 tgtaacacaa taaaatccct ttgtacgatg tctaattgagc acctgagcc ataaattgct
4141 taataaacac attttgggtg att

```

SNW1 cDNA sequence (SEQ ID NO: 15)

>gi|18860912|ref|NM_012245.2| Homo sapiens SKI interacting protein (SKIIP), mRNA

```

1 cgctcgcgct ggaagaagcg gaagaagatg gcgctcacca gctttttacc tgcacctact
61 cagctatctc aggaccagct tgaggctgaa gaaaaggcaa gatccagag atcacggcag

```

```

121 acctcaactgg tctcctcccg aagagaacct cccccgtacg gataccggaa aggctggata
181 cctcgggttat tagaggattt tggagatgga ggtgcttttc cagagatcca tgtggcccag
241 tatccactgg atatgggacg aaagaaaaaa atgtcgaatg cgctggccat tcagggtggat
301 tctgaaggaa aaattaaata tgatgcaatt gctcgacaag gacagtcaaa agacaaggctc
361 atttatagca aatacactga cctgggtcca aaggagggtta tgaatgcaga tgatccagac
421 ctgcaaaggc ccgatgaaga agctattaaa gagataacag aaaagacaag agtagcctta
481 gaaaaatctg tatcacagaa ggtcgccgca gccatgccag ttcgagcagc tgacaaattg
541 gctcctgctc agtatatccg atacacacca tctcagcaag gagtggcatt caactctgga
601 gctaaacaga gggttattcg gatggtagaa atgcagaaag atccaatgga gcctccaagg
661 ttcaagatta ataagaaaat tccccgggga ccaccttctc ctctgcccgc tgtcatgcat
721 tctcctagcc gaaagatgac tgtaaaggaa caacaagagt ggaagattcc tccttgtatt
781 tctaactgga aaaatgcaaa gggttataca attccattag acaaacgtct ggctgctgat
841 ggaagaggac tacagacagt acacataaat gaaaatttcg ccaaattggc agaagccctc
901 tacattgctg atcgggaaggc tcgtgaagct gtggaaatgc gtgcccaggt agagagaaaa
961 atggctcaga aagaaaagga aaaacatgaa gagaaactta gagaaatggc ccagaaagcc
1021 agggagagaa gagctgggat caaaactcat gtggaaaaag aggatgggga ggcacgtgag
1081 agggatgaaa tccggcatga caggcgaaaa gagagacagc atgaccggaa tctttccagg
1141 gcagctcctg ataagaggct gaaacttcag agaaatgaaa atcgggatat cagtgaagtt
1201 attgctctcg gtgttcctaa tcctcggact tccaatgaag ttcagtatga ccaaaggctc
1261 ttcaaccaat ccaagggtat ggacagtgga tttgcagggt gagaagatga aatttataat
1321 gtttatgata aagcctggag aggtggtaaa gatatggccc agagtattta taggcccagt
1381 aaaaatctgg acaaggacat gtatggtgat gacctagaag ccagaataaa gaccaacaga
1441 tttgttcccg acaaggagtt ttctgggtca gaccgtagac agagaggccg agaaggacca
1501 gtgcagtttg aggaagatcc ttttggtttg gacaagtttt tggagaagc caaacagcat
1561 ggtggctcta aaagaccctc agatagcagc cgcccagag aacacgagca tgaaggcaag
1621 aagaggagga aggaataggc acaggtctct ccaaagtga tgaactctta ccataaccc
1681 taatgatgca agtcatatgg gggaacactt tgtaaattgg caggataaaa accaaatctg
1741 ggtgccagat cccagcacta ctttttatta ctggagaaat gggggggata gaaaattcta
1801 ctttgaatta tttagttttt tttaaagagt gggttgtgtt tgtgcttctc ccacctttca
1861 gcatttatag aacatgctgc cccacatata aagtcaagac cacttacttt tatgtgacac
1921 tagtagtttg gggttaatgt tttgtgtaag aacagctgca tatgagtaaa gttaccccaa
1981 ccacagtgag gaggaagatg ttcacatact ggaactgtcc tgccaaataa attttgcccc
2041 tattgtgctc tgttttaatt tggagtgggc aaagtaacct cttgcttggg gcaactattt
2101 gtttcaaata aaaacattta gacaaaaaaa aaaaaaaaaa aaaa

```

ERG cDNA sequence 1 (SEQ ID NO: 16)

NM_182918 Homo sapiens v-ets erythroblastosis virus E26 oncogene like (avian), (ERG), transcript variant 1, mRNA

```

1 aatctcatcc gctctaaaca acctcatcaa aactactttc tggtcagaga gaagcaataa
61 ttattattaa catttattaa cgatcaataa acttgattgc attatggcca gcactattaa
121 ggaagcctta tcagttgtga gtgaggacca gtcgttgttt gagtgtgcct acggaacgcc
181 acacctggct aagacagaga tgaccgcgtc ctccctccagc gactatggac agacttccaa
241 gatgagccca cgcgtccctc agcaggattg gctgtctcaa ccccagcca gggtcaccat
301 caaaatggaa tgtaacccta gccaggtgaa tggctcaagg aactctcctg atgaatgcag
361 tgtggccaaa ggcgggaaga tgggtgggcag ccagacacc gttgggatga actacggcag
421 ctacatggag gagaagcaca tgccaccccc aaacatgacc acgaacgagc gcagagttat
481 cgtgccagca gatcctacgc tatggagtac agaccatgtg cggcagtggc tggagtgggc
541 ggtgaaagaa tatggccttc cagacgtcaa catcttggtt ttccagaaca tcgatgggaa
601 ggaactgtgc aagatgacca aggacgactt ccagaggctc accccagct acaatgccga
661 catccttctc tcacatctcc actacctcag agagactcct ctccacatt tgacttcaga
721 tgatgttgat aaagccttac aaaactctcc acggttaatg catgctagaa acacaggggg
781 tgcagctttt attttcccaa atacttcagt atatcctgaa gctacgcaaa gaattacaac
841 taggccagat ttaccatatg agccccccag gagatcagcc tggaccggtc acggccaccc
901 cacgccccag tcgaaagctg ctcaaccatc tccttccaca gtgcccacaa ctgaagacca
961 gcgtcctcag ttagatcctt atcagattct tggaccaaca agtagccgcc ttgcaaatcc
1021 aggcagtggc cagatccagc tttggcagtt cctcctggag ctctgtcgg acagctccaa
1081 ctccagctgc atcacctggg aaggcaccaa cggggagttc aagatgacgg atcccagcga
1141 ggtggcccg cgctggggag agcgggaagag caaacccaac atgaactacg ataagctcag
1201 ccgcgcctc cgttactact atgacaagaa catcatgacc aaggtccatg ggaagcgcta
1261 cgcctacaag ttcgacttcc acgggatcgc ccaggccctc cagccccacc ccccgagtc
1321 atctctgtac aagtaccctc cagacctccc gtacatgggc tcctatcacg cccaccaca
1381 gaagatgaac tttgtggcgc cccacctccc agccctcccc gtgacatctt ccagtttttt
1441 tgctgcccc aaccataact ggaattcacc aactgggggt atatacccca acactaggct
1501 ccccaccagc catatgcctt ctcatctggg cacttactac taaagacctg gcggaggctt
1561 ttcccatcag cgtgcattca ccagcccatc gccacaaact ctatcggaga acatgaatca
1621 aaagtgcctc aagaggaatg aaaaaagctt tactggggct ggggaaggaa gccggggaag
1681 agatccaaag actcttggga gggagtact gaagtcttac tacagaaatg aggaggatgc
1741 taaaaatgtc acgaatatgg acatatcatc tgtggactga ctttgtaaaa gacagtgtat

```

1801 gtagaagcat gaagtcttaa ggacaaagtg ccaaagaaag tggctcttaag aaatgtataa
 1861 acttttagagt agagtttgga atcccactaa tgcaaactgg gatgaaacta aagcaataga
 1921 aacaacacag ttttgaccta acataccgtt tataatgcca ttttaaggaa aactacctgt
 1981 atttaaaaat agaaacatat caaaaaaaaa aaaaaa

ERG cDNA sequence 2 (SEQ ID NO: 17)

NM_004449 Homo sapiens v-ets erythroblastosis virus E26 oncogene like (avian), (ERG), transcript variant 2, mRNA

1 atgattcaga ctgtcccga cccagcagct catatcaagg aagccttatac agttgtgagt
 61 gaggaccagt cggtgtttga gtgtgcctac ggaacgccac acctggctaa gacagagatg
 121 accgcgtcct cctccagcga ctatggacag acttccaaga tgagcccacg cgtccctcag
 181 caggattggc tgtctcaacc cccagccagg gtcaccatca aaatggaatg taaccctagc
 241 caggtgaatg gctcaaggaa ctctcctgat gaatgcagtg tggccaaagg cgggaagatg
 301 gtgggcagcc cagacaccgt tgggatgaac tacggcagct acatggagga gaagcacatg
 361 ccacccccaa acatgaccac gaacgagcgc agagttatcg tgccagcaga tcctacgcta
 421 tggagtacag accatgtgcg gcagtggctg gagtgggagg tgaaagaata tggccttcca
 481 gacgtcaaca tcttggtatt ccagaacatc gatgggaagg aactgtgcaa gatgaccaag
 541 gacgacttcc agaggctcac cccagctac aacgccgaca tccttctctc acatctccac
 601 tacctcagag agactcctct tccacatttg acttcagatg atgttgataa agccttataa
 661 aactctccac ggttaatgca tgctagaaac acagatttac catatgagcc ccccaggaga
 721 tcagcctgga ccggtcacgg ccaccccacg cccagtcga aagctgctca accatctcct
 781 tccacagtgc ccaaaactga agaccagcgt cctcagttag atccttatca gattcttgga
 841 ccaacaagta gccgccttgc aaatccaggc agtggccaga tccagctttg gcagttcctc
 901 ctggagctcc tgctcgacag ctccaactcc agctgcatca cctgggaagg caccaacggg
 961 gagttcaaga tgacggatcc cgacgaggtg gcccggcgt ggggagagcg gaagagcaaa
 1021 cccaacatga actacgataa gctcagccgc gccctccgtt actactatga caagaacatc
 1081 atgaccaagg tccatgggaa gcgctacgcc tacaagttcg acttccacgg gatcgcccag
 1141 gccctccagc cccaccccc ggagtcattc ctgtacaagt acccctcaga cctcccgtac
 1201 atgggctcct atcacgcca cccacagaag atgaactttg tggcgcccca ccctccagcc
 1261 ctccccgtga catcttccag tttttttgct gcccacaaacc catactggaa ttcaccaact
 1321 ggggggtatat accccaacac taggctcccc accagccata tgccttctca tctgggcact
 1381 tactactaa

[0294] Following are amino acid sequences for *KIAA0296* (SEQ ID NO:18), *PSMB1* (SEQ ID NO: 19), *TBP* (SEQ ID NO: 20), *PDCD2* (SEQ ID NO: 21 and 22), *ELP3* (SEQ ID NO: 23), *LRCH1* (SEQ ID NO: 24), *SNW1* (SEQ ID NO: 25), and *ERG* (SEQ ID NO: 26 and 27).

KIAA0296 amino acid sequence (SEQ ID NO: 18)

>gi|55643765|ref|XP_510945.1| PREDICTED: KIAA0296 gene product [Pan troglodytes]

MEDTPPSLSCSDCQRHFPSLPESLRHRELLHPSPNQDSEEADSIPRPYRCQQCGRGYRHPG
 SLVNHRRTHETGLFPCTTCGKDFSNPMALKSHMRTHAPEGRRRHRPPRPKEATPHLQGE
 TVSTD SWGQRLGSSEG WENQTKHTEETPDCE SVDPRAASGTWEDLPTRQREGLASHPG
 PEDGADGWGPSTNSARAPPLPIPASSLLSNLEQYLAESVVNFTGGQEPTQSPPAEEERRY
 KCSQCGKTYKHAGSLTNHRQSHTLGIYPCAIKFESNLMAKLNHSRLHAQYRPHYCPH
 CPRVFRLPRELLEHQQSHEGERQEPHWEEKGMPTTNGHTDESSQDQLPSARMLNGSAEL
 ITSGELEDSGLEEYRPFRCGDCGRTYRHAGSLINHRKSHQTGVYPCSLCSKQLFNAAALK
 NHVRAHHRPRQGVGENGQPSVPPAPLLLAETTHKEEEDPTTTLDHRPYKCSECGRAYRH
 RGSLVNHRHSHRTGEYQCSLCPRKYPNLMALRNHVRVHCKAARRSADIGAEGAPSHLK
 VELPPDPVEAEAAPH TDQDHVCKHEEEATDITPAADKTA AHICSICGLLFEDPESLERHGL
 THGAGEKENSR TETTMSPPRAFACRDCGKSYRHSGLINHRQTHQTGDFSCGACAKHFH
 TMAAMKNHLRRHSRRRSRRHRKRAGGASGGREAKLLAESWTRELEDNEGLESQDPS
 GESPHGAEGNLESDGDCLQAESEGDKCGLERDETHFQGDKESGGTGEGLKRKDASLLD
 NLDIPGEEGGGTHFCDSL TGVDEDQKPATGQPNSSSHSANA VTGWQAGAAHTCSDCGH
 SFPHATGLLSHRPCHPPGIYQCSLCPKEFDSL PALRSHFQNH RPGEATSAQPFLCCLCGMI
 FPGRAGYRLHRRQA HSSSGMTEGSEEEGEEEGVAEAAPARSPPLQLSEAELLNQLQREV
 EALDSAGYGHICGCCGQTYDDLGS LERHHQSQSSGTTADKAPSPLGVAGDAMEMVVD S

VLEDIVNSVSGEGGDAKSQEGAGTPLGDSL CIQGGESLLEAQPRPFRCNQCGKTYRHGG
 SLVNHRKIHQTGDFLCPVCSRCYPNLAAYRNHLRNHPRCKGSEPQVGPIPEAAGSSEPQV
 GPIPEGGSNKPQHMAEEGPGQAEVEKLQEELKVEPLEEVARVKEEVWEETTVKGEEIEPR
 LETAEKGCQTEASSERPFSCCEVCGRSYKHAGSLINHRQSHQTGHFGCQACSKGFSNLMSL
 KNHRRIHADPRRFRCSECGKAFRLRKQLASHQRVHMERRGGGGTRKATREDRPFRCGQ
 CGRTYRHAGSLLNHRRSHETGQYSCPTCPKTYSNRMALKDHQRLHSENRRRRRAGRSR
 TAVRCALCGRSFPGRGSLERHLREHEKTEREPANGQGGLDGTAAASEANLAGSQGLETQL
 GGAEPVPHLEDGVPRPGRSQQSPIRAASSEAPEPLSWGAGKAGGWPVGGGLGNHSGGW
 VPQFLTRSEEPEDSVHRSPCHASDCQLNGPNLSHMDSWDNRDNSSQLQPGSHSSSCSQC
 GKTYCQSGSLLNHNTHKTD RHYCLCSKEFLNPVATKSHSHNHIDAQTFACPD CGKAFE
 SHQELASHLQAHARGHSQVPAQMEEARDPKAGTGEDQVVLPGQGKAREAPSETPRDPG
 ESVERARGGQAVTSM AAEDEKERPFRCCTQCGRSYRHAGSLLNHQKAHTTGLYPCSLCPK
 LLPNLLSLKNHSRTH TDPKRHCCSICGKAFRTAARLEGHGRVHAPREGPFTCPHCPRHFR
 RRISFVQHQQQHQQE EWTVAGSVQAQLQQQQSLARVTSLIRGHLRGESPPPSTAGSRSCQ
 GVGRPVP SAGPGLASPPPLVEADPFHLVATEAGQLTHSTGTHHPWQNRAAVTPRSCMQP
 AAGPRPQEGHGHCL EGADACGARES WLPRPAGWMDSSPGVPPTYLLGGPVPEPSRAP
 HQAGGGPTPPIKDQADEAQYCQLVRQLDDHKDVVTLLAEG LRESRKHIEDEKLVR YFL
 DKTLTSRLGIRMLATHHLALHEDKPDFVGIICTRLSPKKIIEKWVDFARRLCEHKYGNAP
 RVRINGHVAARFPFIPMPLDYILPELLKNAMRATMESHLDTPYNVPDVVITIANNNDVDLII
 RISDRGGGIAHKDLDRVMDYHFTTAEASTQDPRISPLFGHLDMHSGAQSGPMHGFGL
 PTSRAYAEYLGGSLQLQSLQGIGTDVYLRLRHIDGREESFRI

PSMB1 amino acid sequence (SEQ ID NO: 19)

NP_002784 Homo sapiens proteasome (prosome, macropain) subunit, beta type, 1 (PSMB1), protein

MLSSTAMYSAPGRDLGMEPHRAAGPLQLRFSPYVFNGGTILAIAGEDFAIVASDTRLSEGFSIHTR
 DSPKCYKLTDKTVIGCSGFHGDCLTLTKIIEARLKMYKHSNNKAMTTGAIAAMLSTILYSRRFFP
 YYVYNIIGGLDEEGKGAVYSFDPVGSYQRDSFKAGGSASAMLQPLLDNQVGFKNMQNVEHVPL
 SLDRAMRLVKDVFISAAERDVYTG DALRICIVTKEGIREETVSLRKD

TBP amino acid sequence (SEQ ID NO: 20)

NP_003185 Homo sapiens TATA box binding protein (TBP), protein

MDQNNSLPPYAQGLASPQGAMTPGIPIFSPMMPYGTGLTPQPIQNTNSLSILEEQQRQQQQQQQQQ
 QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQAVAAAAVQQSTSQQATQGTSGQAPQLFHSQ
 TLTTAPLPGTTPLYPSPMTPTPATPASESSGIVPQLQNIVSTVNLGCKLDLKTIALRARNAYEY
 NPKRFAAVIMRIREPRTTALIFSSGKMVCTGAKSEEQSRLAARKYARVVQKLGFPAKFLDFKIQN
 MVGSCDVKFPIRLEGLVLTHQQFSSYEPELFPGLIYRMIKPRIVLLIFVSGKVVLTGAKVRAEIYEA
 FENIYPILKGFRKTT

PDCD2 amino acid sequence 1 (SEQ ID NO: 21)

NP_002589 Homo sapiens programmed cell death 2 (PDCD2), isoform 1, protein

MAAAGARPVELGFAESAPAWRLRSEQFPSKVGGPRAWLGAAGLPGPQALACELCGRPLSFLLO
 VYAPLPGRPDAFHRCIFLFCREQPCCAGLRVFRNQLPRKNDFYSEPPSENPPPETGESVCLQLK
 SGAHLCRVCGCLGPKTCSRCHKAYYCSKEHQTLDWRLGHKQACAQPDHLDHIIPDHNFLFPEFE
 IVIETEDEIMPEVVEKEDYSEIIGSMGEALEEELDSMAKHESREDKIFQKFKTQIALEPEQILRYGR
 GLAPIWISGENIPQEKDIPDCPCGAKRILEFQVMPQLLNLYLKADRLGKSIDWGLAVFTCAESCSLG
 TGYTEEFVWKQDVTDTTP

PDCD2 amino acid sequence 2 (SEQ ID NO: 22)

NP_659005 Homo sapiens programmed cell death 2 (PDCD2), isoform 2, protein

MAAAGARPVELGFAESAPAWRLRSEQFPSKVGGPRAWLGAAGLPGPQALACELCGRPLSFLLO
 VYAPLPGRPDAFHRCIFLFCREQPCCAGLRVFRNQLPRKNDFYSEPPSENPPPETGESVCLQLK
 SGAHLCRVCGCLGPKTCSRCHKAYYCSKEHQTLDWRLGHKQACAQPDHLDHIIPDHNFLFPEFE
 IVIETEDEIMPEVVEKEDYSEIIGSMGKQFQDFIH

ELP3 amino acid sequence (SEQ ID NO: 23)

NP_060561 Homo sapiens elongation protein 3 homolog (S. cerevisiae) (ELP3), protein

MRQKRKGDLSPAELMMLTIGDVIKQLIEAHEQGKDIDLNKVKTKTAAKYGLSAQPRLVDIIAAV
 PPQYRKVLMPKLKAKPIRTASGLAVVAVMCKPHRCPHISFTGNICVYCPGGPDSDFEYSTQSYTG
 YEPTSMRAIRARYDPFLQTRHRIEQLKQLGHSVDKVEFIVMGGTFMALPEEYRDYFIRNLHDALS
 GHTSNNIYEAVKYSERSLTKCIGITETRPDYCMKRHLSDMLTYGCTRLEIGVQSVYEDVARDTN
 RGHTVKAVCESFHLAKDSGFKVVAHMMPDLPNVGLERDIEQFTEFFENPAFRPDGLKLYPTLVI
 RGTGLYELWKSGRYKSYSPSDLVELVARILALVPPWTRVYRVQRDIPMPLVSSGVEHGNLRELA
 LARMKDLGIQCRDVRTREVGIIQEIHHKVRPYQVELVRRDYVANGGWETFLSYEDPDQDILIGLL
 RLKRCSEETFRFELGGGVSVRELHVYGSVVPVSSRDPTKFQHQGFGLLMEEAERIAAREEHGSG
 KIAVISGVGTRNYRKYRIGYRLQGPYMKMLK

LRCH1 amino acid sequence (SEQ ID NO: 24)

NP_055931 Homo sapiens calponin homology (CH) domain containing 1 (CHDC1), protein

MATPGSEPQPFVPALSVATLHPLHHPHHHHHHHQHGGGTGAPGGAGGGGGGGSGGFNLPLNRGL
 ERALEEAANSGLNLSARKLKEFPRTAAPGHDLSDTVQADLSKNRLVEVPMELCHFVSLEILNL
 YHNCIRVIPEAIVNLQMLTYLNLSRNQLSALPACLCGLPLKVLIASNNKLGSLEEIGQLKQLMEL
 DVSCNEITALPQQIGQLKSLRELNVRRNYLKVLPQELVDLPLVKFDFSCNKVLVIPICFREMKQLQ
 VLLLENNPLQSPPAQICTKGKVHIFKYLSIQACQIKTADSLYLHTMERPHLHQHVEDGKKDSDSG
 VGSDNGDKRLSATEPSDEDTVSLNVPMSNIMEEEQIIKEDSCHRLSPVKGEFHQEFQPEPSLLGDS
 TNSGEERDQFTDRADGLHSEFMNYKARAEDCEELLRIEEDVHWQTEGISSSKDQDMDIAMIEQL
 REAVDLLQDPNGLSTDITERSVLNLYPMGSAEALQLDSALNGQIQLETSPVCEVQSDLTLSQNG
 SQYSPNEIRENSPAVSPTTNSTAPFGLKPRSVFLRPQRNLESIDPQFTIRRKMEQMREEKELVEQLR

ESIEMRLKVSLHEDLGAALMDGVVLCHLVNHIRPRSVASIHVPSPAVPKLSMAKCRRNVENFLE
ACRKLGVPEADLCSPCDILQLDFRHIRKTVDTLLALGEKAPPPTSALRSRDLIGFCLVHILFIVLVY
ITYHWNALSA

SNW1 amino acid sequence 1 (SEQ ID NO: 25)

>gi|6912676|ref|NP_036377.1| SKI-interacting protein [Homo sapiens]

MALTSFLPAPTQLSQDQLEAEEKARSQRSRQTSLVSSRREPPPYGYRKGWIPRLLEDGFGGGAFF
EIHVAQYPLDMGRKKKMSNALAIQVDSEGKIKYDAIARQGQSKDKVIYSKYTDLVPKEVMNAD
DPDLQRPDEEAIKEITEKTRVALEKSVSQKVAAAMPVRAADKLAPAQYIRYTPSQQGVAFNSGA
KQRVIRMVEMQKDPMEPPRFKINKKIPRGPPSPAPVMHSPSRKMTVKEQQEWKIPPCISNWKN
AKGYTIPLDKRLAADGRGLQTVHNENFAKLAEALYIADRKAREAVEMRAQVERKMAQKEKEK
HEEKLREMAQKARERRAGIKTHVEKEDGEARERDEIRHDDRKERQHNRNLSRAAPDKRSKLQR
NENRDISEVIALGVPNPRTSNEVQYDQRLFNQSKGMDSGFAGGEDEIYNVYDQAWRGGKDMAQ
SIYRPSKNLDKDMYGDDLEARIKTNRFVPDKEFSGSDRRQRGREGPVQFEEDPFGLDKFLEEAKQ
HGGSKRPSDSSRPKEHEHEGKKRRKE

ERG amino acid sequence 1 (SEQ ID NO: 26)

NP_891548 Homo sapiens v-ets erythroblastosis virus E26 oncogene like (avian), (ERG), isoform 1,
protein

MASTIKEALSVVSEDQSLFECAYGTPHLAKTEMTASSSSDYGQTSKMSPRVPQQDWLSQPPARV
TIKMECNPSQVNGSRNSPDECSVAKGGKMVGSPDTVGMNYGSYMEEKHMPPPNMTTNERRVIV
PADPTLWSTDHVRQWLEWAVKEYGLPDVNILLFQNIDGKELCKMTKDDFQRLTPSYNADILLSH
LHYLRETPLPHLTSDDDVDKALQNSPRLMHARNTGGAAFIFPNTSVYPEATQRITTRPDLPEPPRR
SAWTGHGHPTPQSKAAQPSPSTVPKTEDQRPQLDPYQILGPTSSRLANPGSGQIQLWQFLLELLS
DSSNSSCITWEGTNGEFKMTDPDEVARRWGERKSKPNMNYDKLSRALRYYYDKNIMTKVHGK
RYAYKFDHFGIAQALQPHPESSLYKYPSDLPYMGSYHAHPQKMNFVAPHPPALPVTSSSFFAAP
NPYWNSPTGGIYPNTRLPTSHMPSHLGTTY

ERG amino acid sequence 2 (SEQ ID NO: 27)

NP_004440 Homo sapiens v-ets erythroblastosis virus E26 oncogene like (avian), (ERG), isoform 2,
protein

MIQTVPDPAAHIKEALSVVSEDQSLFECAYGTPHLAKTEMTASSSSDYGQTSKMSPRVPQQDWL
SQPPARVTIKMECNPSQVNGSRNSPDECSVAKGGKMVGSPDTVGMNYGSYMEEKHMPPPNMT
TNERRVIVPADPTLWSTDHVRQWLEWAVKEYGLPDVNILLFQNIDGKELCKMTKDDFQRLTPS
YNADILLSHLHYLRETPLPHLTSDDDVDKALQNSPRLMHARNTDLPYEPPRRSAWTGHGHPTPQS
KAAQPSPSTVPKTEDQRPQLDPYQILGPTSSRLANPGSGQIQLWQFLLELLSDSSNSSCITWEGTN
GEFKMTDPDEVARRWGERKSKPNMNYDKLSRALRYYYDKNIMTKVHGKRYAYKFDHFGIAQA
LQPHPESSLYKYPSDLPYMGSYHAHPQKMNFVAPHPPALPVTSSSFFAAPNPYWNSPTGGIYPN
TRLPTSHMPSHLGTTY

[0295] Modifications may be made to the foregoing without departing from the basic aspects of the invention. Although the invention has been described in substantial detail with reference to one or more specific embodiments, those of skill in the art will recognize that changes may be made to the embodiments specifically disclosed in this application, yet these modifications and improvements are within the scope and spirit of the invention, as set forth in the aspects which follow. All publications or patent documents cited in this specification are incorporated herein by reference as if each such publication or document was specifically and individually indicated to be incorporated herein by reference.

[0296] Citation of the above publications or documents is not intended as an admission that any of the foregoing is pertinent prior art, nor does it constitute any admission as to the contents or date of these publications or documents. U.S. patents and other publications referenced herein are hereby incorporated by reference.